

B Plant Chemical Sewer Stream-Specific Report

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management



Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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Addendum 6

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K. A. Peterson

Date Published
August 1990

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B Plant CHEMICAL SEWER STREAM-SPECIFIC REPORT

K. A. Peterson

ABSTRACT

The proposed wastestream designation for the B Plant Chemical Sewer (BCE) wastestream is that this stream is not a dangerous waste, pursuant to the Washington (State) Administration Code (WAC) 173-303, Dangerous Waste Regulations. A combination of process knowledge and sampling data was used to make this determination.*

*Ecology, 1989, *Dangerous Waste Regulations*, Washington (State) Administrative Code (WAC) 173-303, Washington State Department of Ecology, Olympia, Washington.

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EXECUTIVE SUMMARY

The proposed wastestream designation for the B Plant Chemical Sewer (BCE) wastewater stream is that the stream is not a dangerous waste, pursuant to the Washington (State) Administrative Code (WAC) 173-303, *Dangerous Waste Regulations*.^{*} This designation, made by applying a combination of process knowledge and sample data for the BCE routine operation (October 1989 to March 1990) was used to determine if the effluent contains a listed dangerous waste (WAC 173-303-080). Sampling data alone is used to compare to the dangerous waste criteria (WAC 173-303-100) and dangerous waste characteristics (WAC 173-303-090). Sample data for the BCE routine operation was from the October 1989 to March 1990 timeframe that is based on the *Liquid Effluent Study Characterization Data* (WHC-EP-0355).^{**}

Resampling of the BCE anion and cation configurations should be performed as discussed in Section 6.0.

^{*}Ecology, 1989, *Dangerous Waste Regulations*, Washington (State) Administrative Code (WAC) 173-303, Washington State Department of Ecology, Olympia, Washington.

^{**}WHC, 1990, *Liquid Effluent Study Characterization Data*, WHC-EP-0355, Westinghouse Hanford Company, Richland, Washington.

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LIST OF TERMS

| | |
|---------------------|---|
| ALARA | as low as reasonably achievable |
| AMU | aqueous makeup units |
| BCE | B Plant Chemical Sewer |
| CI | confidence interval |
| DOE | U.S. Department of Energy |
| EC | equivalent concentration |
| Ecology | Washington State Department of Ecology |
| EP | extraction procedure |
| EPA | U.S. Environmental Protection Agency |
| FDC | functional design criteria |
| FPMCS | Facility/Process Monitor and Control System |
| FY | fiscal year |
| HEC | Hanford Environmental Compliance |
| HH | halogenated hydrocarbons |
| HVAC | heating, ventilation, and air conditioning |
| IARC | International Agency for Research on Cancer |
| ISE | ion specific electrode |
| IWT | Illinois Water Treatment |
| Mgal | Million Gallons |
| NCAW | neutralized current acid waste |
| PAH | polycyclic aromatic hydrocarbons |
| PUREX | Plutonium-Uranium Extraction |
| REDOX | Reduction-Oxidation |
| RTRP | reinforced thermosetting resin pipe |
| Tri-Party Agreement | <i>Hanford Federal Facility Agreement and Consent Order</i> |
| VCP | vittrified clay pipe |
| WAC | Washington (State) Administrative Code |
| WESF | Waste Encapsulation and Storage Facility |
| wt% | weight percent |

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B PLANT CHEMICAL SEWER STREAM-SPECIFIC REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

In response to the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989), comments from the public were received regarding reduction of the discharge of liquid effluents into the soil column. As a result, the U.S. Department of Energy (DOE), with concurrence of the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA), committed to assess both the waste disposal and contaminant migration potential of liquid discharges at the Hanford Site (Lawrence 1989).

This assessment is described in the *Liquid Effluent Study Project Plan* (WHC 1990c). A portion of this study consists of characterizing 33 liquid effluent streams. The characterization consists of the following elements: process data, sampling data, and dangerous waste designations pursuant to the Washington (State) Administrative Code (WAC) 173-303 (Ecology 1989).

The results of the characterization study are documented in 33 separate reports, one report for each wastestream. The complete list of stream-specific reports appears in Table 1-1. This document is one of the 33 reports.

1.2 APPROACH

This report characterizes the B Plant Chemical Sewer (BCE) wastestream in sufficient detail to both support a designation per the *Dangerous Waste Regulations*, WAC 173-303, and so that an assessment of the relative effluent priorities can be made with regard to the need for treatment and/or alternative disposal practices.

This characterization strategy (see Figure 1-1) is implemented by means of the following steps.

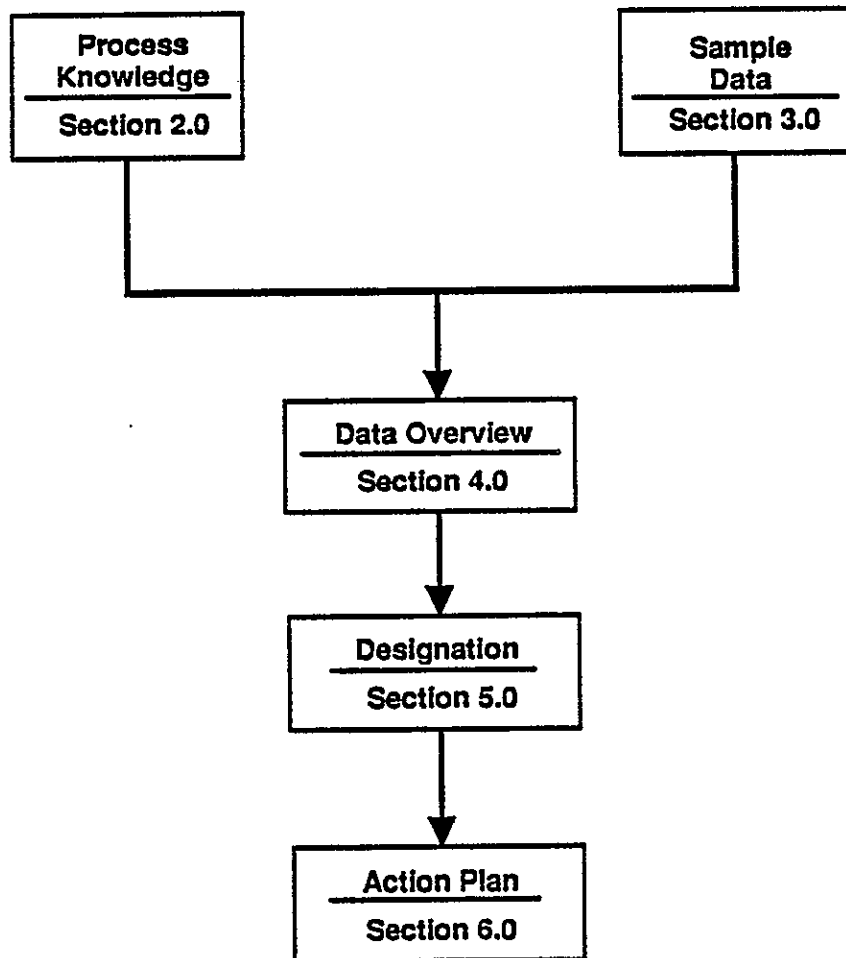
- Describe both the process and sampling data (Sections 2.0 and 3.0, respectively).
- Compare data and stream deposition rates (Section 4.0).

WHC-EP-0342 Addendum 6 08/31/90
B Plant Chemical Sewer

Table 1-1. Stream-Specific Characterization Reports.

| | | |
|-------------|-------------|--|
| WHC-EP-0342 | Addendum 1 | 300 Area Process Wastewater |
| WHC-EP-0342 | Addendum 2 | PUREX Plant Chemical Sewer |
| WHC-EP-0342 | Addendum 3 | N Reactor Effluent |
| WHC-EP-0342 | Addendum 4 | 163N Demineralization Plant Wastewater |
| WHC-EP-0342 | Addendum 5 | PUREX Plant Steam Condensate |
| WHC-EP-0342 | Addendum 6 | B Plant Chemical Sewer |
| WHC-EP-0342 | Addendum 7 | UO ₃ /U Plant Wastewater |
| WHC-EP-0342 | Addendum 8 | Plutonium Finishing Plant Wastewater |
| WHC-EP-0342 | Addendum 9 | S Plant Wastewater |
| WHC-EP-0342 | Addendum 10 | T Plant Wastewater |
| WHC-EP-0342 | Addendum 11 | 2724-W Laundry Wastewater |
| WHC-EP-0342 | Addendum 12 | PUREX Plant Process Condensate |
| WHC-EP-0342 | Addendum 13 | 222-S Laboratory Wastewater |
| WHC-EP-0342 | Addendum 14 | PUREX Plant Ammonia Scrubber Condensate |
| WHC-EP-0342 | Addendum 15 | 242-A Evaporator Process Condensate |
| WHC-EP-0342 | Addendum 16 | B Plant Steam Condensate |
| WHC-EP-0342 | Addendum 17 | B Plant Process Condensate |
| WHC-EP-0342 | Addendum 18 | 2101-M Laboratory Wastewater |
| WHC-EP-0342 | Addendum 19 | UO ₃ Plant Process Condensate |
| WHC-EP-0342 | Addendum 20 | PUREX Plant Cooling Water |
| WHC-EP-0342 | Addendum 21 | 242-A Evaporator Cooling Water |
| WHC-EP-0342 | Addendum 22 | B Plant Cooling Water |
| WHC-EP-0342 | Addendum 23 | 241-A Tank Farm Cooling Water |
| WHC-EP-0342 | Addendum 24 | 284-E Powerplant Wastewater |
| WHC-EP-0342 | Addendum 25 | 244-AR Vault Cooling Water |
| WHC-EP-0342 | Addendum 26 | 242-A Evaporator Steam Condensate |
| WHC-EP-0342 | Addendum 27 | 284-W Powerplant Wastewater |
| WHC-EP-0342 | Addendum 28 | 400 Area Secondary Cooling Water |
| WHC-EP-0342 | Addendum 29 | 242-S Evaporator Steam Condensate |
| WHC-EP-0342 | Addendum 30 | 241-AY/AZ Tank Farms Steam Condensate |
| WHC-EP-0342 | Addendum 31 | 209-E Laboratory Reflector Water |
| WHC-EP-0342 | Addendum 32 | T Plant Laboratory Wastewater |
| WHC-EP-0342 | Addendum 33 | 183-D Filter Backwash Wastewater |

Figure 1-1. Characterization Strategy.



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- Propose a designation (Section 5.0).
- Design an action plan, if needed, to obtain additional characterization data (Section 6.0).

1.3 SCOPE

The scope of this report is the characterization of the BCE effluent that enters the soil column. The time perspective of this document is focused on the recent past and the near future (approximately 1987 to 1993). Information outside of this time period was included if the data were relevant to the development of the study.

This report contains "new" sampling data (i.e., October 1989 through March 1990) for one of the three BCE system configurations, routine operations, which was active during this time frame.

2.0 PROCESS KNOWLEDGE

This section presents a qualitative and quantitative process knowledge-based characterization of the chemical and radiological constituents of the BCE. These process data are discussed in terms of the following factors:

- Location and physical layout of the process facility
- General description of the present, past, and future activities of the process
- Identity of the wastestream contributors
- Concentration of the constituents of each contributor.

2.1 PHYSICAL LAYOUT

The B Plant is located in the 200 East Area of the Hanford Site (Figure 2-1). The B Plant is comprised of three main adjoining buildings: 271-B, 221-B, and 225-B (Figure 2-2) (and several auxiliary buildings). The 221-B Building, along with its attached service building (271-B), was constructed in 1943; this complex is known as B Plant. Construction of the 225-B Building, the Waste Encapsulation and Storage Facility (WESF), was completed in 1974.

The following subsections contain a brief description of each of the above-listed buildings.

2.1.1 The 221-B Building

The processing portion of the 221-B Building consists of a canyon and craneway, 40 process cells, a hot pipe trench, and a ventilation tunnel.

The service and operating portion of the 221-B Building consists of an operating gallery, a pipe gallery, and an electrical gallery (Figure 2-3).

2.1.2 The 271-B Building

The service building (271-B) is attached to B Plant and includes offices, aqueous makeup facilities, and maintenance shops.

Figure 2-1. The B Plant Site Plan.

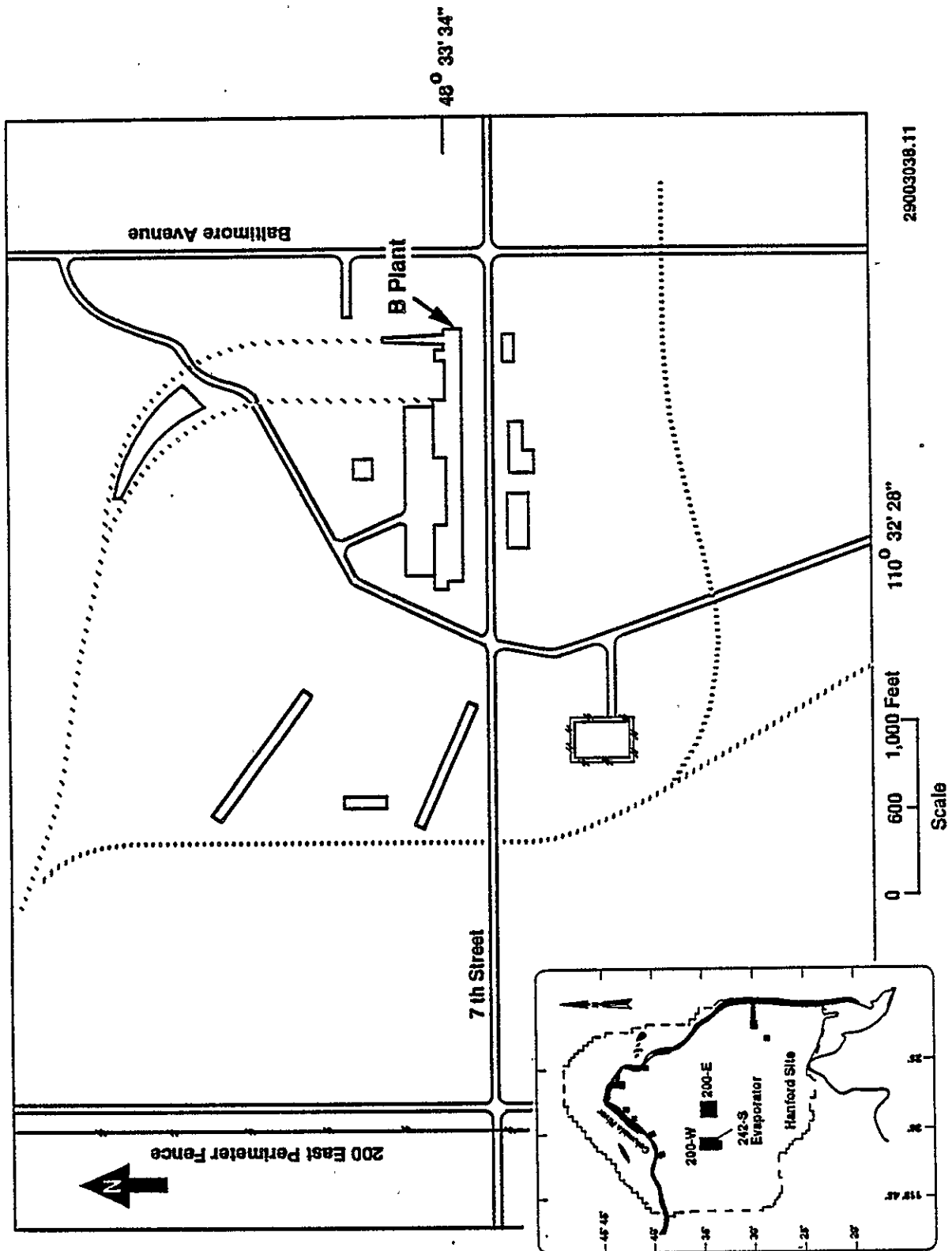
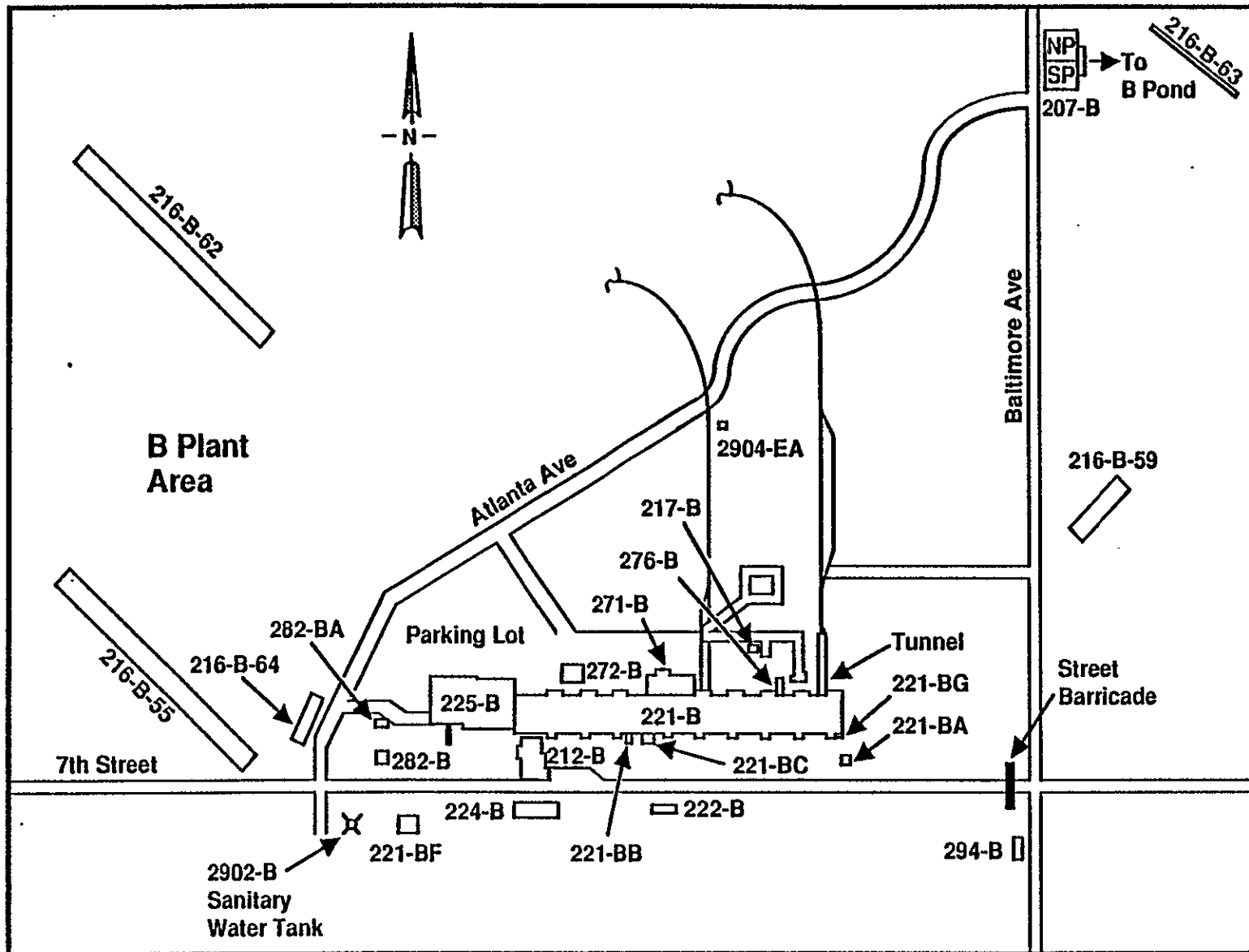


Figure 2-2. The B Plant and Related Facilities.



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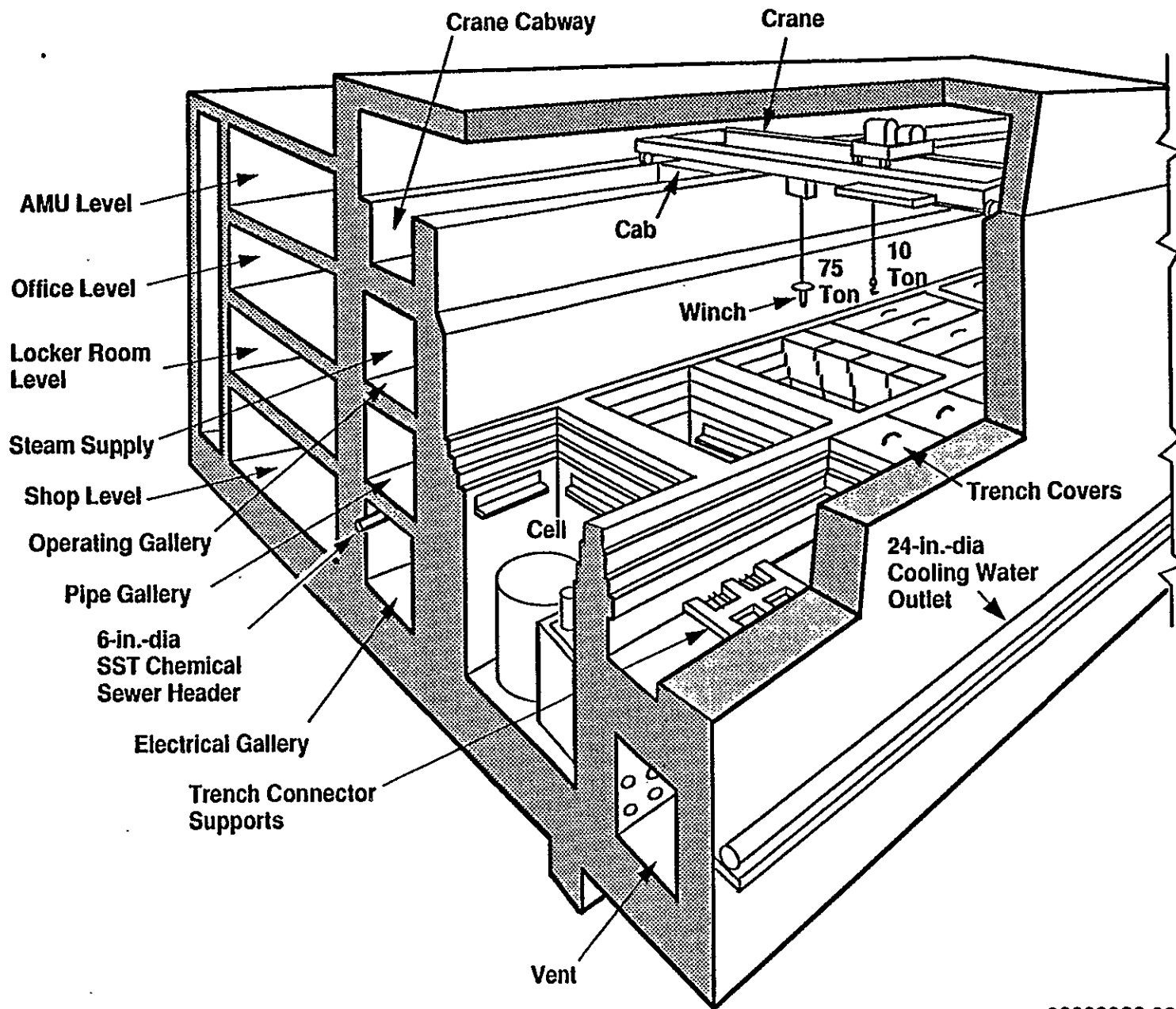


Figure 2-3. The B Plant Schematic (221-B and 271-B Cut-Away).

2.1.3 The 225-B Building

This building's floor plan (building area is approximately 20,000 ft²) is partitioned into several functional areas: (1) process hot cell areas, (2) the hot cell (canyon) service areas, (3) operating areas, (4) building services areas, and (5) the storage pool area.

2.2 CONTRIBUTORS

The major contributors to the chemical sewer are the 2902-B High Tank (contains potable sanitary water), cooling water from the B Plant and WESF air-compressor aftercoolers, some of the 221-B steam condensate, and the demineralizer effluent. The chemical sewer could also receive minor contributions from chemical makeup overflow systems (sodium hydroxide and sodium nitrite), air conditioning units, and space heaters (radiators). These are controlled to levels that are less than the regulated values. Physical surveillance during the filling of the chemical makeup tanks protects against this possible introduction into the system. The chemical sewer has an average flowrate of less than 150 gal/min.

Under potential accident scenarios, failure to contain chemicals stored or used can contribute to the BCE. An analysis of reasonable accident scenarios indicates that the BCE could receive contributions of hazardous materials via the drains in areas of operation or chemical storage.

In order to prevent such discharges, the B Plant has installed or plans to install significant engineering and administrative controls. Currently, all active storage tanks are equipped with level indicators that are monitored daily by shift personnel or continuously by the use of the Facility/Process Monitor and Control System (FPMCS). Whenever possible, valves leading from chemical tanks to the BCE are locked closed. All hazardous material is disposed in accordance with approved Westinghouse Hanford Company procedures.

An operability test was conducted on the online BCE monitoring system or both the beta radiation and pH monitors. The operability test showed that the pH monitor was accurate to within 0.2 pH units. The operability test also showed that the beta radiation monitor could test and would alarm the presence of strontium and cesium within 1.7 times the administrative control value (5 E-06 μ Ci/mL and 5 E-05 μ Ci/mL, respectively).

The gamma monitor, which automatically diverts the contents of the 6-in. stainless steel chemical sewer header to TK-10-1 upon detection of high levels of radioactivity, is for process control and does not detect at administrative control value levels or intended as a release monitor. The monitor is functionally tested for operability.

Secondary containment of potential contributors to the BCE is being installed under project funding as described in Section 2.3.5.

Under normal conditions, the BCE receives only water and nonregulated buffer solution from the contributors discussed previously. However, the potential exists for any chemical used at B Plant for processing or housekeeping to be discharged into the BCE.

Of the approximately 500 commercial products used at B Plant, less than 160 contain ingredients that could affect the designation of the stream based on the listed constituents under WAC 173-303-9903 and -9904 (Ecology 1989). Documentation or knowledge of any of these products being discharged into the BCE could not be found except what is indicated.

2.3 PROCESS DESCRIPTION

2.3.1 Background

The B Plant receives and stores various chemicals from commercial manufacturers for use in the pretreatment of defense wastes, generation of demineralized water, and conditioning of water used in heating, ventilation, and air conditioning (HVAC) units. The BCE can receive spills, chemical drains, water flushes, and other effluents from drains in the 221-B, 217-B, and 271-B Buildings and the 211-B Area where these various chemicals are stored and used (Figure 2-4). The BCE can also receive waste steam condensate, cooling water, HVAC unit wash water, sanitary water, and other effluents from the WESF, 225-BC Air Compressor Building, 212-B Cask Station, 276-B Building, 2902-B Sanitary Water Tank, 222-B HVAC system, and 224-B HVAC and floor drains.

The BCE drains into the 216-B-63 disposal trench where effluents are disposed of through absorption in the soil or evaporation. The BCE consists of a main 15-in. vitrified clay pipe (VCP) that extends north of the 221-B Building to the 216-B-63 Ditch, which is located approximately 2,500 ft northeast of 221-B Building (Figure 2-4). The BCE has several manholes where subheader piping join the main sewer. At manhole number 14, which is located north of the 211-B Chemical Storage Tank Farms, the 15-in. VCP is separated into two 10-in. reinforced thermosetting resin pipe (RTRP) headers and a 4- and 8-in. VCP. One of the 10-in. RTRP headers traverses south from manhole number 14 and connects to a 6-in. RTRP header that runs between the area around the 211-B Area and 221-B Building.

The 6-in. header collects effluents from the sodium hydroxide storage tank area pump basin, sodium hydroxide storage tank cooling coil effluent water, steam condensate and wash water from 221-B HVAC units (east side only). Discharge from 221-B 6-in. stainless steel header in the electrical gallery is routed to Cell 10.

The 8-in. VCP header collects effluent from regeneration of the demineralized water unit in the 217-B Building and from ditches in the 211-B Chemical Storage Tank Farms. The 4-in. VCP header into manhole 14 is capped and not used.

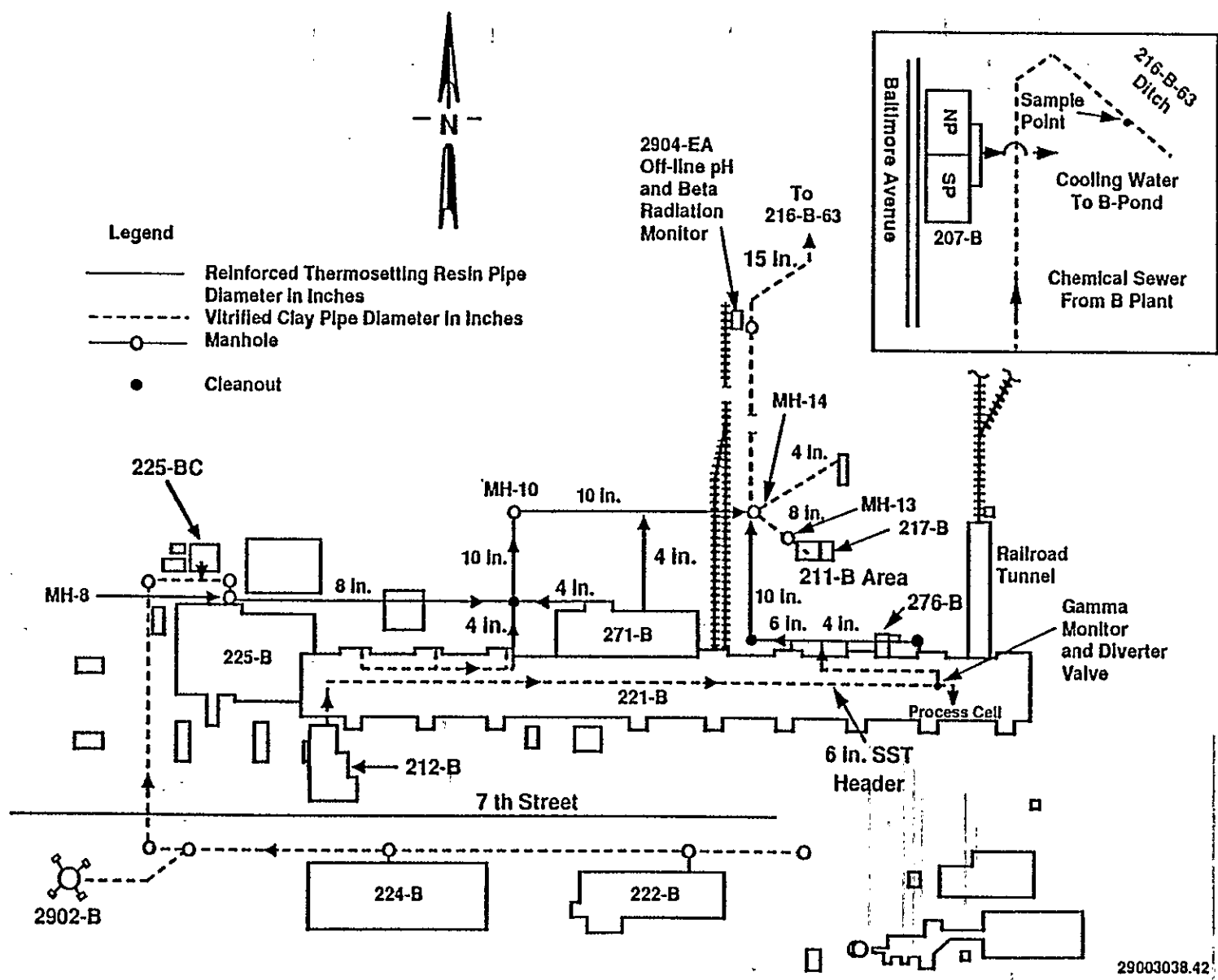


Figure 2-4. Chemical Sewer--B Plant Area Map.

The second 10-in. RTRP header extends west, parallel to 221-B Building, to manhole number 10, which is located northwest of the 271-B Building. This header receives effluents from the floor drains and steam condensate discharge from 271-B Building from a 4-in. RTRP subheader. The 10-in. RTRP traverses south from manhole number 10 and collects cooling water from the air compressors in 271-B Building and then traverses west parallel to 221-B Building. The 10-in. RTRP header joins a 10-in. VCP header at manhole number 8, turns south at the northwest corner of the 225-B Building, extends 150 ft and turns east ending 10 ft east of the 222-B Building. This 10-ft RTRP/VCP header collects steam condensate and wash water from the 221-B HVAC units (west side only), steam condensate from steam lines in 221-B Building, steam condensate from 225-B HVAC system and 225-BC Compressor Building, aqueous makeup units (AMU) tank overflow and floor drains from WESF, water overflow from the 2902-B Sanitary Water Tank, 222-B HVAC system, 224-B HVAC, and floor drains. The 10-in. VCP header also collects rain water from a street drain located northeast of 2902-B Building and south of Seventh Street.

The facility systems that drain into the BCE headers are further described in the following sections. A diagram of the chemical flowpaths at B Plant is shown in Figure 2-5.

2.3.2 System Description

2.3.2.1 Demineralized Water Unit. Demineralized water is generated at the B Plant for use in the WESF capsule storage pool cells and for pretreatment of defense wastes. Demineralized water is generated at the 217-B Building using a commercial water treatment unit that removes cation and anion impurities from a potable water source (sanitary water) using ion exchange resins. The ion exchange resins, supplied by the Illinois Water Treatment (IWT) Company, are C-211 (cation) and A-264 (anion). Periodic regeneration of these ion exchange resins is conducted.

The BCE stream sample data are for routine operation of the 217-B Demineralizer. Sampling of the BCE stream should be performed for the remaining two configurations during both anion and cation regeneration as discussed in Section 6.0. Regenerations are normally performed semiannually.

Sodium hydroxide (anion), sulfuric acid (cation), and buffers are used as process chemicals during the regeneration of the Demineralized Water Unit. The regenerate discharge is collected in a holding tank and neutralized before being discharged into the BCE stream. The regeneration effluent volume is 11,000 gal.

Two floor drains in the 217-B Building collect effluents from tank drains and overflow lines. The effluents are routed to the BCE at manhole number 13 through a 4-in. steel drain pipe connected to an 8-in. steel pipe. A steam condensate line from the building steam heating system exits the building and discharges to the BCE at manhole number 13 through a 4-in. steel header.

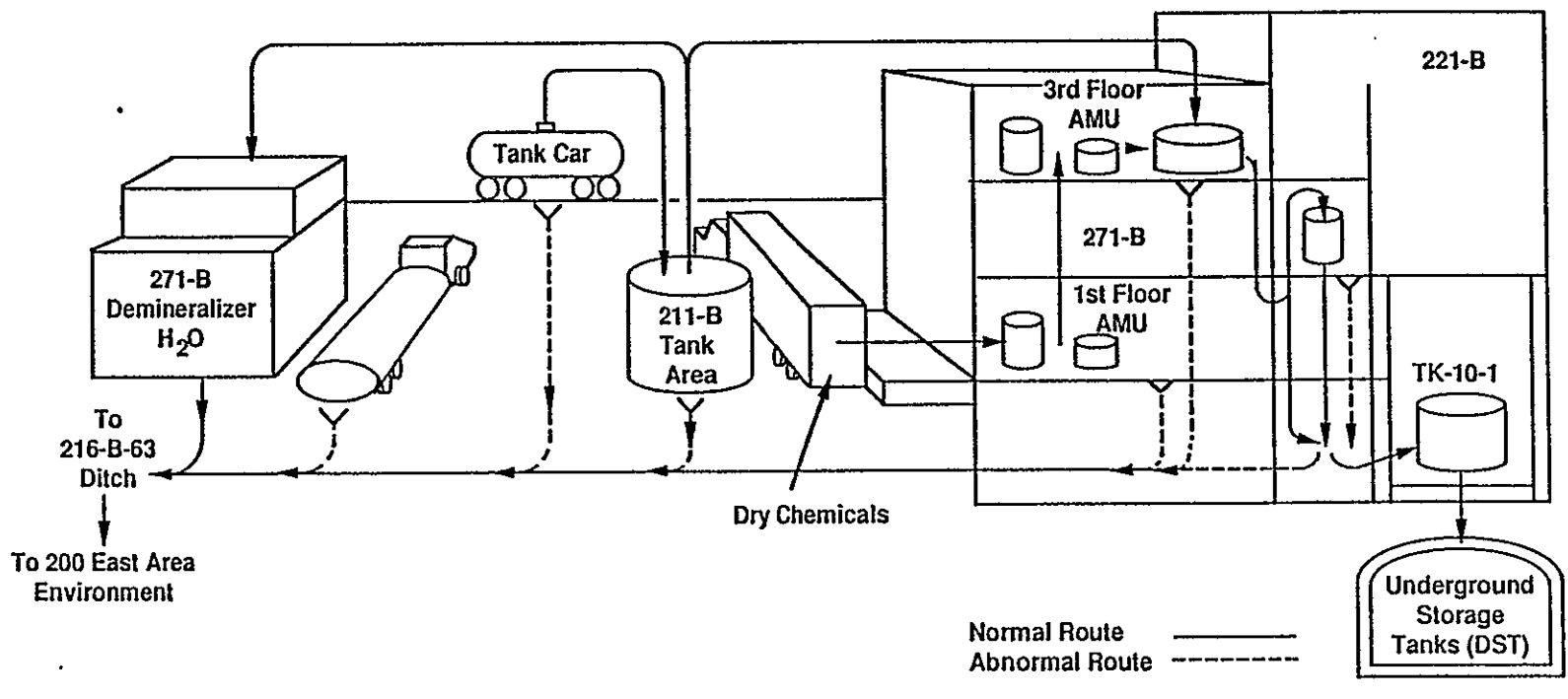


Figure 2-5. Flow of Chemicals at B Plant.

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2.3.2.2 221-B Drain System. Chemical wastes and other effluents from 221-B Facilities can be received into a 6-in. stainless steel header that traverses the electrical gallery. The floor drains located throughout the operating and pipe galleries collect chemicals, water from the safety showers, and other common janitorial chemicals used during housekeeping operations. The AMU tanks and scale tanks in the operating gallery drain and overflow into 3-in. drain pipes. The vent headers for these tanks drain to the chemical drain system at Cells 8, 12, 15, 19, 20, and 31 in the operating gallery via funnels. These drains and overflow lines are connected to 3-in. drain pipes that discharge into the 6-in. stainless steel header in the electrical gallery.

The electrical gallery is provided with sumps in 18 locations. These sumps collect chemicals and other liquids used during housekeeping operations. Each sump is provided with a liquid detection device that alarms in the dispatcher's office in the 271-B Building. Alarms are recorded and identified by the automated FPMCSs. The sumps are equipped with pumps that discharge collected liquids into the 6-in. stainless steel header. The contents of the 6-in. header can either be routed to the BCE or retained within the 221-B Building.

Steam condensate from the steam lines in the operating and pipe galleries and cooling water from the instrument air compressor (electrical gallery) are discharged into a 3-in. RTRP header located in the west end of the electrical gallery. This header is routed directly to the chemical sewer via a 4-in. RTRP pipe.

2.3.2.3 271-B Drain System. A drain collection system in the 271-B Building collects effluent from all floor drains and sinks, cooling water from process air compressors, steam condensate from steam area radiators, hot water tanks, heating-cooling coils in AMUs, HVAC unit air washer water and water treatment chemicals, and common janitorial chemicals. Collected liquid effluents are nonradioactive and are discharged into the BCE through a 4-in. RTRP that exits the north side of 271-B Building and combine with the 10-in. RTRP header traversing the north side of 221-B Building.

2.3.2.4 221-B Chemical Storage Tanks. A 6-in. RTRP header on the south side of the 221-B Storage Tanks area receives cooling water from the demineralized water storage tanks heat exchangers and pumps and steam condensate from the sodium hydroxide tanks heat exchangers and heat trace. The 6-in. RTRP header connects to a 10-in. RTRP header that discharges into the BCE at manhole number 14.

A truck loading-unloading location on the north side of the 211-B Storage Tanks area drains to a 4-in. steel header that discharges to the BCE at manhole number 13.

Steam condensate/cooling water from the cooling coils of the vertical chemical storage tanks are collected in two 4-in. steel headers and discharge to the BCE at manhole number 13. A tank car unloading station on the west side of the vertical storage tanks is used to receive and transfer commercial chemicals into storage tanks.

2.3.2.5 Other Effluent Sources. Several other buildings contribute to effluents in the BCE. These buildings include the 276-B floor and vessel overflow drains, WESF AMU floor and vessel overflow drains, 225-BC Compressor cooling water and steam condensate, WESF steam condensate, 212-B Cask Station Drains, 222-B HVAC System, 224-B HVAC System and floor drains, and a street drain located northeast of 2902-B Building and south of Seventh Street.

Physical and administrative controls, including hazardous waste management and handling procedures as well as hazardous material training procedures, are in place at B Plant and WESF to prevent chemicals from entering floor drains. In addition, both sitewide and plant specific environmental compliance manuals provide further guidance in the handling of hazardous materials. A thorough review of the facility consisting of interviews with plant personnel and physical inspections produced evidence that no discharge of chemical products into the BCE stream occur. Also in place at B Plant are specific operating procedures to handle the remote possibility of chemical leaks or spills that include instructions and controls for preventing discharge of hazardous substances to the chemical sewer.

The DOE has established limits to ensure that all federal requirements are met. The DOE policy is to reduce or eliminate releases of dangerous waste to the environment. Westinghouse Hanford Company's policy is that contamination levels will be as low as reasonably achievable (ALARA) (WHC 1987). The B Plant uses sampling, monitoring, and recycling techniques to meet these goals.

2.3.3 Present Activities

This section covers the period between October 1989 and March 1990.

The BCE is an active stream and can receive spills and chemical drainage in addition to water flushes, stream condensate, and other liquid effluents. The October 1989 through March 1990 flowrate for the BCE averaged approximately 130 gal/min. The stream discharges into the 216-B-63 open ditch. The contributors to the BCE stream are listed in Table 2-1. The B Plant and WESF chemicals stored and their locations are listed in Table 2-2.

The BCE was named for its original design intent. Its use for hazardous chemical disposal was abandoned before 1984. The BCE does not communicate with the radioactive processing areas of B Plant and does not come in contact with tank farm wastes.

Table 2-1. Contributing Streams to B Plant Chemical Sewer.
(sheet 1 of 2)

| Building | System | Contributor to BCE | Flowrate (gal/d) |
|----------|--|---|-------------------------|
| 271-B | Basement Floor Drains | Steam condensate Raw water Janitor supplies Maintenance supplies | 0-1000 (271-B Total) |
| | 1st Level Floor Drains | Sanitary water Janitor supplies | |
| | 2nd Level Floor Drains | Sanitary water Janitor supplies | |
| | 3rd Level Floor Drains | Sanitary water Steam condensate | |
| 271-B | HVAC Unit | Steam condensate Sanitary water Dearborn ^a -727 Dearborn-730 | 0-2000 |
| 271-B | Process Air Comp. Instru. Air Comp. | Raw water Sanitary water | 5000-15000 |
| 221-B | HVAC Unit | Steam condensate Sanitary water | 0-20 |
| 221-B | Pipe & Operating | Steam condensate | 1000-2000 |
| 221-B | Scale Tanks | None | Not Appl. |
| 221-B | Electrical Gallery Sumps | None | Not Appl. |
| 276-B | Floor Drains | Steam condensate | 0-1000 |
| 217-B | Demineralizer | Sanitary water & neutralized spent regenerant (sulfuric acid, sodium hydroxide, monosodium phosphate sodium carbonate) | 1000-5000 |

^aDearborn is a trademark of W. R. Grace & Co., Lake Zurich, Illinois.
HVAC = heating, ventilation, and air conditioning

Table 2-1. Contributing Streams to B Plant Chemical Sewer.
(sheet 2 of 2)

| Building | System | Contributor to BCE | Flowrate (gal/d) |
|---------------|-------------------------------------|--|---------------------|
| 211-B Area | Chemical Storage Tanks | Raw water Sanitary water Steam condensate | 0-76000 |
| 225-B | AMU Makeup Tanks Floor Drains | Steam condensate Raw water | 0-500 |
| 225-B | HVAC | Sanitary water Condensation | 0-50 |
| 225-BC | Air Compressor | Raw water | 500-5000 |
| 224-B | HVAC | Sanitary water Steam condensate Dearborn ^a -730 | 0-500 |
| 222-B | HVAC | Sanitary water Steam condensate Dearborn ^a -730 | 0-500 |
| 212-B | HVAC | Steam condensate | 0-50 |
| 2902-B | Sanitary Water Storage Tank | Sanitary water | 0-88000 |
| 225-B | Yard Drains | Rain water | 0-1000 |

^aDearborn is a trademark of W. R. Grace & Co., Lake Zurich, Illinois.

Table 2-2. B Plant and Waste Encapsulation and
Storage Facility Chemical Storage Locations.
(sheet 1 of 2)

| Building | Location | Stored Chemicals |
|---------------|---------------|--|
| 271-B | Basement | Janitors cleaning supplies Maintenance supplies in locked cabinets |
| | 1st Floor | Janitor supplies |
| | 2nd Floor | Janitor supplies |
| | 3rd Floor | Sodium Nitrate Sodium Nitrite Sodium Carbonate Sodium Bicarbonate 1,1,1-Trichlorethane Lanthanum Neodymium Nitrate SS-25 Perchloroethylene Unisol ND-150 ^c Celite Zeolon-900 Freon 113 Diatomaceous Earth Turco ^a -Decon 4518/4502 Dearborn ^b -727 Scale Cleen ^d Citric Acid Wedac Monosodium Phosphate Batteries (sulphuric acid) Voltz Super Safety Solvent Diethylene-glycol-monobutyl-ether (light water foam) |
| 211-B Area | Storage Tanks | Nitric Acid EDTA - Ethylenediaminetetraacetic Acid HEDTA - Hydroxyethylenediaminetriacetic Acid ANN - Aluminum Nitrate Nanohydrate Sodium Hydroxide |

^aTurco is a trademark of TP Industrial, Inc., Lakewood, California.

^bDearborn is a trademark of W. R. Grace & Co., Lake Zurich, Illinois.

^cND-150 is a trademark of NCH Corporation.

^dScale-Cleen is a trademark of W. R. Grace & Co., New York, New York.

Table 2-2. B Plant and Waste Encapsulation and
Storage Facility Chemical Storage Locations.
(sheet 2 of 2)

| Building | Location | Stored Chemicals |
|----------|---------------------------|--|
| 217-B | Demineralizer Building | Sulfuric Acid Sodium Hydroxide |
| 212-B | HVAC Room | Dearborn ^b 4690 |
| 225-B | 2nd Floor | Tri-sodium Phosphate Phosphoric Acid Hydrochloric Acid |

^bDearborn is a trademark of W. R. Grace & Co., Lake Zurich, Illinois.

Process chemicals are used during the regeneration of the demineralizer in the 217-B Building and operation of the 221-B/271-B HVAC units. The following chemicals are defined to be BCE process chemicals based on current plant operating needs:

- Sulfuric acid
- Sodium hydroxide
- Sodium bicarbonate
- Sodium carbonate
- Monosodium phosphate
- Dearborn*-727
- Dearcide**-730
- IWT C-211/A-264.

Sodium hydroxide (anion), sulfuric acid (cation), and buffers are used as process chemicals during the regeneration of the demineralizer in the 217-B Building. The regenerate discharge is collected in a holding tank, neutralized, and discharged into the BCE stream. The process chemicals utilized during the operation of the HVAC units include microbiocides used as cooling water treatment for the control of algae, bacteria, and fungi. The HVAC effluent also discharges directly to the BCE stream. It should be noted that evaporative losses of water due to heating and cooling operation can be expected to increase the natural mineral content of this stream above that found in the influent sanitary water.

Potential Chemicals--Physical and administrative barriers have been installed into the BCE system to assist in the prevention of any releases. Unauthorized releases of chemicals into the BCE system are in violation of procedures. However, the potential exists for any chemical present at the Hanford Site to be released into the BCE system. A review of facility operation indicates that no releases have occurred other than those indicated in Section 2.3.4 of this report. The valves that discharge to BCE on all chemical tanks are locked and tagged closed. Administrative procedures require that a tank's contents be known and determined to be nonhazardous before the lock can be removed and the contents discharged.

A monitoring system is installed in the 2904-EA Building (see Figure 2-4) to provide online pH and beta radiation monitoring for the BCE stream. A process control gamma radiation monitor is also located adjacent to the 6-in. chemical sewer header in the B Plant electrical gallery, which upon detection of gross gamma radionuclides, automatically diverts the contents of the 6-in. header to tank TK-10-1. Alarms, located in the dispatcher's office in the 271-B Building, are tied into the FPMCS and identify the following conditions at the BCE:

- High radiation
- System trouble (no flow, power failure, detector failure)
- High or low pH
- Sample system failure.

*Dearborn is a trademark of W. R. Grace & Co., Lake Zurich, Illionis.

**Dearcide is a trademark of W. R. Grace & Co., New York, New York.

Flow proportional sampling of the BCE stream is performed at an enclosure at the 216-B-63 Ditch. Loss of the upstream beta monitor, located in 2904-EA Building and tied into the FPMCS, requires additional manual sampling of the BCE stream until the monitor has been returned to service.

The B Plant processes radioactive defense wastes for disposal. During the processing of these wastes, a variety of chemicals are used. The policy at B Plant is to not allow regulated chemicals to reach the chemical sewer. In March 1986, a revised management plan was incorporated into the existing chemical sewer management to ensure that all federal and state regulatory requirements were met. Westinghouse Hanford Company has its own policy whereby contamination levels will be ALARA (WHC 1987).

2.3.4 Past Activities

This section covers the period before October 1989.

A number of missions have been performed at B Plant since its construction in 1943. The plant's first mission was the recovery of plutonium using a bismuth phosphate chemical separation process. The process was carried out from April 1945 to October 1952. The B Plant was shut down after the Reduction-Oxidation (REDOX) and Plutonium-Uranium Extraction (PUREX) Plants came online. The B Plant was modified to begin its second mission in 1962; the recovery, purification, and encapsulation of cesium and strontium from wastes received from the tank farms.

In general, contributors to the BCE from 1945 to 1969 included (1) used steam and water from space heaters, tank heaters, and air conditioning units, (2) overflow from chemical tanks, and (3) nonradioactive solutions used in general housekeeping procedures.

On March 22, 1970, approximately 1,000 Ci of ^{90}Sr were released into the previous receiver of the BCE stream, 216-B-2-2 Ditch, because of the failure of a portable manometer system. For contamination containment, the 216-B-2-2 Ditch, which had lead to B Pond, was dammed 1,000 ft downstream from the spill. A majority of the contamination was contained within the ditch; however, a small portion was released into B Pond. The estimated release to B Pond is shown below.

March 22, 1970 Release Data.

| | |
|----------------------|--------|
| Total beta | 154 Ci |
| ^{137}Cs | 13 Ci |
| ^{90}Sr | 50 Ci |
| $^{144}\text{Ce-Pr}$ | 54 Ci |

The 216-B-63 Ditch, current receiver of the BCE, was excavated 2 mo after the March 22, 1970, release. Following completion of the 216-B-63 Ditch, the BCE stream was permanently diverted from the 216-B-2-2 Ditch.

Project B-496, Chemical Sewer Upgrades (completed on September 30, 1985), relined a major portion of the VCP on the north side of 221/271-B Building with RTRP because of suspected failure of the original VCP.

The incidental releases to the 216-B-63 Ditch from the BCE are listed in Table 2-3 (WHC 1989).

Table 2-3. Incidental Releases (200 East Area).

| B Plant Chemical Sewer-- Disposed to the 216-B-63 Ditch | | |
|--|-------------------------|-------------|
| Date | Constituent | Amount (lb) |
| March 28, 1987 | Corrosive, unknown acid | 2,500 |
| April 4, 1987 | Corrosive, nitric acid | 6,300-(5) |

2.3.5 Future Activities

This section covers the period after March 1990.

This section contains a detailed description of project upgrades for the BCE system. The upcoming mission for B Plant is the treatment of selected double-shell tank wastes and wastestreams to accomplish the separation into high-level, transuranic, and low-level waste fractions. This processing will be in preparation for disposal as either a vitrified or cementitious waste form. In an effort to prepare for this mission, B Plant is undergoing a thorough upgrade program. The following functional design criteria (FDC) for the projects listed below may be subject to change.

2.3.5.1 Project W-003. Project W-003, "B-Plant Chemical Sewer Environmental Upgrades," is planned as a fiscal year (FY) 1990 General Plant Project. This project will provide the following upgrades to the BCE.

1. Reroute and replace the existing VCP downstream of the 211-BA Neutralization Facility, thereby eliminating the use of the 216-B-63 Ditch.
2. Replace the VCP between manhole 13 and manhole 14, thus assuring the integrity of the effluent piping.
3. Provide retention capability and treatment of the 217-B Demineralizer cation and anion regeneration effluents upstream of the 211-BA Neutralization Facility.

2.2.5.2 Project W-008. In July 1989, a document was issued providing the FDC for upgrading the BCE system to provide elementary neutralization capabilities to prevent the discharge of corrosive materials to the 216-B-63 Ditch from the BCE. Project W-008, "B Plant Chemical Sewer Neutralization System," is associated with Tri-Party Agreement Milestone M-17-04 and will provide the following upgrades to the BCE system:

1. Elementary inline neutralization, if required, to maintain the pH between 6.0 and 10.0
2. Prevent the discharge of corrosive materials to the environment from the BCE stream.

2.3.5.3 Project W-004. Project W-004, "B Plant AMU Area Upgrade," is associated with Tri-Party Agreement Milestone M-17-04 and provides modifications and upgrades to accomplish the following objectives:

1. Secondary containment for the eight west side 271-B AMU to support full-scale operations of the new mission at B Plant
2. Instrumentation and alarm upgrades for the AMUs for easy identification of potential problems by B Plant process operators
3. Adequate structural support of the concrete floor beneath the designated AMU on third floor of 271-B Building
4. Secondary containment curbs to ensure segregation of incompatible chemicals and containment of hazardous material (110% containment of the largest tank in any curbed area).

2.3.5.4 Project W-010H. Project W-010H, "B Plant Environmental Compliance Upgrades," is associated with Tri-Party Agreement Milestone M-17-04 and is planned as a subpart of the Hanford Environmental Compliance (HEC) 1990 Line Item. The modifications and upgrades to be performed as part of this project include the following:

1. Secondary containment for the vertical and horizontal tanks in the area around the 211-B Building (110% containment of any tank in the curbed area)
2. Instrumentation and alarm upgrades for the 211-B Storage Tanks to provide easy identification of potential problems by B Plant process operators
3. Overhead transfer piping support system in the area around the 211-B Building, to minimize the potential of a release caused by pipe support failure
4. Independent drain system for the scale tanks in the 221-B Operating Gallery

5. Instrumentation, control, and alarm upgrades for the 221-B Operating Gallery Scale Tanks to assist B Plant process operators in the prevention of a release.

2.3.5.5 Project W-120. Project W-120, "B Plant Manhole 14 Upgrade," is planned as a 1990 capital work order project. The upgrade to be performed by this project is to replace manhole 14 with a precast manhole.

2.3.5.6 Summary. Currently, B Plant is in a maintenance outage in preparation for the treatment of double-shell tank wastes as explained earlier in this section. The initiation of treatment operations at B Plant should not affect the content or designation of the BCE stream.

3.0 SAMPLE DATA

This section provides an evaluation of the sampling data pertaining to the BCE wastestream. These data are divided into two categories--wastestream data and feed source data. All of the raw sampling data for the BCE is contained in Appendix B of this report.

3.1 DATA SOURCE

Two sources of sampling data were used in this analysis: wastestream data, for the routine operation configuration, and feed source data.

The sampling scheme took representative samples by following *Test Methods for Evaluating Solid Wastes*, SW-846, procedure sampling and analytical protocol (EPA 1986). This protocol requires that a sufficient number of samples be taken in a random manner over a period of time to characterize variability or uniformity of the stream. In some cases, ASTM procedures were used when more appropriate than *Test Methods for Evaluating Solid Wastes*. This was accomplished by taking grab samples on a partitioned time random basis. The sampling was randomized by splitting each workday of the month to be sampled into two 4-h periods and selecting one of these periods by using a random-number generator. All samples were taken to the contract laboratory for analysis. The details of the sampling, analytical, quality control, and quality assurance procedures utilized are contained in Volume 4 of the *Waste Stream Characterization Report* (WHC 1989).

3.2 DATA PRESENTATION

The analytical methods run on the corresponding samples are identified in Table 3-1.

3.2.1 Wastestream Data

The wastestream data set is composed of four samples collected over a 4-mo time period. This data set contains both radiological and chemical data for the BCE stream (routine operation only, no data for the anion or cation regenerate was taken during this sampling period) taken from October 1989 through March 1990. The dates these samples were taken and the sample identification number are listed in Appendix B of this report. Statistical wastestream data for the BCE are contained in Table 3-2 of this report.

For the BCE system, over 40,000 chemical analytes were of interest. The bulk of these analytes were compiled from a combined mass spectral library from the EPA, the National Institute of Occupational Safety and Health, and the National Bureau of Standards. This library was composed of approximately

Table 3-1. Analytical Methods for Samples.
(sheet 1 of 2)

| LEAD# C of C# | 50705 50705 | 50752 50752 | 50756 50756 | 50984 50984 |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|
| Alkalinity | X | X | X | X |
| Alpha counting | X | X | X | |
| ²⁴¹ Am | X | | X | |
| Ammonia | X | X | X | X |
| Arsenic | X | X | X | X |
| Atomic emission spectroscopy | X | X | X | X |
| Beta counting | X | X | X | |
| ¹⁴ C | | X | X | |
| Conductivity-field | X | X | X | X |
| Curium isotopes | X | | X | |
| Cyanide | X | X | X | X |
| Direct aqueous injection (GC) | X | X | X | X |
| Fluoride (LDL) | X | X | X | X |
| Gamma energy analysis | X | X | X | |
| Hydrazine | X | X | X | X |
| Ion chromatography | X | X | X | X |
| Lead | X | X | X | X |
| Low-energy photon detection | | | X | |
| Mercury | X | X | X | X |
| pH-field | X | X | X | X |
| Plutonium isotopes | | X | | |
| Selenium | X | X | X | X |
| Semivolatile organics (GC/MS) | X | X | X | X |
| Strontium beta counting | X | X | X | |
| Sulfide | X | X | X | X |
| Suspended solids | X | X | X | X |
| Temperature-field | X | X | X | X |
| Thallium | X | X | X | X |
| Total carbon | X | X | X | X |
| Total dissolved solids | X | X | X | X |
| Total organic carbon | X | X | X | X |
| Total organic halides (LDL) | X | X | X | X |
| Total radium alpha counting | X | X | X | |
| Tritium | X | X | X | |
| Uranium | X | X | X | |
| Uranium isotopes | X | X | X | |
| Volatile organics (GC/MS) | X | X | X | X |
| LEAD# C of C# | 50705B 50706 | 50752B 50753 | 50756B 50757 | 50984B 50985 |
| Volatile organics (GC/MS) | X | X | X | X |
| LEAD# C of C# | 50705T 50707 | 50752T 50754 | 50756T 50758 | 50984T 50986 |
| Volatile organics (GC/MS) | X | X | X | X |

Table 3-1. Analytical Methods for Samples.
(sheet 2 of 2)

| LEAD# C of C# | 50705E 50708 | 50752E 50755 | 50756E 50759 | 50984E 50987 |
|------------------------------|-----------------|-----------------|-----------------|-----------------|
| Atomic emission spectroscopy | X | X | X | X |
| Ignitability | X | X | X | X |
| Mercury (mixed matrix) | X | X | X | X |
| Reactive cyanide | X | X | X | X |
| Reactive sulfide | X | X | X | X |

Notes: Procedures that were performed for a given sample are identified by an "X". Procedure references appear with the data.

LEAD# is the Liquid Effluent Analytical Data number that appears in the data reports. C of C# is the chain-of-custody number.

Abbreviations:

gas chromatography (GC)
low-detection limit (LDL)
mass spectrometry (MS).

Table 3-2. B Plant Chemical Statistical
Wastestream Data.
(sheet 1 of 2)

| Constituent | N | MDA | Method | Mean | StdErr | 90%CILim | Maximum |
|-------------------------------|---|-----|--------|-----------|----------|-----------|-----------|
| Arsenic (EP Toxic) | 4 | 4 | n/a | <5.00E+02 | 0.00E+00 | <5.00E+02 | <5.00E+02 |
| Barium | 4 | 0 | n/a | 2.92E+01 | 8.54E-01 | 3.06E+01 | 3.10E+01 |
| Barium (EP Toxic) | 4 | 4 | n/a | <1.00E+03 | 0.00E+00 | <1.00E+03 | <1.00E+03 |
| Boron | 4 | 1 | DL | 1.85E+01 | 7.85E+00 | 3.14E+01 | 4.20E+01 |
| Cadmium (EP Toxic) | 4 | 4 | n/a | <1.00E+02 | 0.00E+00 | <1.00E+02 | <1.00E+02 |
| Calcium | 4 | 0 | n/a | 1.84E+04 | 2.10E+02 | 1.88E+04 | 1.89E+04 |
| Chloride | 4 | 0 | n/a | 1.50E+03 | 1.63E+02 | 1.77E+03 | 1.90E+03 |
| Chromium (EP Toxic) | 4 | 4 | n/a | <5.00E+02 | 0.00E+00 | <5.00E+02 | <5.00E+02 |
| Copper | 4 | 0 | n/a | 2.12E+01 | 5.20E+00 | 2.98E+01 | 3.60E+01 |
| Fluoride | 4 | 0 | n/a | 1.39E+02 | 1.58E+00 | 1.42E+02 | 1.43E+02 |
| Iron | 4 | 1 | DL | 5.32E+01 | 9.41E+00 | 6.87E+01 | 7.00E+01 |
| Lead (EP Toxic) | 4 | 4 | n/a | <5.00E+02 | 0.00E+00 | <5.00E+02 | <5.00E+02 |
| Magnesium | 4 | 0 | n/a | 4.15E+03 | 8.11E+01 | 4.28E+03 | 4.32E+03 |
| Manganese | 4 | 2 | DL | 5.75E+00 | 4.79E-01 | 6.53E+00 | 7.00E+00 |
| Mercury (EP Toxic) | 4 | 4 | n/a | <2.00E+01 | 0.00E+00 | <2.00E+01 | <2.00E+01 |
| Potassium | 4 | 0 | n/a | 8.01E+02 | 5.28E+01 | 8.87E+02 | 9.23E+02 |
| Selenium (EP Toxic) | 4 | 4 | n/a | <5.00E+02 | 0.00E+00 | <5.00E+02 | <5.00E+02 |
| Silicon | 4 | 0 | n/a | 2.32E+03 | 6.12E+01 | 2.42E+03 | 2.44E+03 |
| Silver (EP Toxic) | 4 | 4 | n/a | <5.00E+02 | 0.00E+00 | <5.00E+02 | <5.00E+02 |
| Sodium | 4 | 0 | n/a | 2.12E+03 | 8.46E+01 | 2.26E+03 | 2.27E+03 |
| Strontium | 4 | 0 | n/a | 9.62E+01 | 3.25E+00 | 1.02E+02 | 1.02E+02 |
| Sulfate | 4 | 0 | n/a | 1.11E+04 | 4.02E+02 | 1.18E+04 | 1.22E+04 |
| Uranium | 3 | 0 | n/a | 4.71E-01 | 3.37E-02 | 5.35E-01 | 5.36E-01 |
| Zinc | 4 | 0 | n/a | 1.27E+01 | 1.25E+00 | 1.48E+01 | 1.60E+01 |
| Acetone | 4 | 3 | DL | 1.12E+01 | 1.25E+00 | 1.33E+01 | 1.50E+01 |
| Ammonia | 4 | 3 | DL | 5.52E+01 | 5.25E+00 | 6.38E+01 | 7.10E+01 |
| Unknown amide | 1 | 0 | n/a | 2.30E+01 | n/a | n/a | 2.30E+01 |
| Alkalinity (Method B) | 4 | 0 | n/a | 5.60E+04 | 7.07E+02 | 5.72E+04 | 5.70E+04 |
| Alpha Activity (pCi/L) | 3 | 2 | DL | 5.55E-01 | 1.60E-01 | 8.57E-01 | 8.22E-01 |
| Beta Activity (pCi/L) | 3 | 2 | DL | 2.18E+00 | 4.32E-01 | 3.00E+00 | 2.97E+00 |
| Conductivity (μS) | 4 | 0 | n/a | 1.46E+02 | 1.17E+01 | 1.65E+02 | 1.75E+02 |
| Ignitability (°F) | 4 | 0 | n/a | 2.09E+02 | 1.29E+00 | 2.07E+02 | 2.06E+02 |
| pH (dimensionless) | 4 | 0 | n/a | 7.45E+00 | 1.32E-01 | 7.67E+00 | 7.70E+00 |
| Reactivity Cyanide (mg/kg) | 4 | 4 | n/a | <1.00E+02 | 0.00E+00 | <1.00E+02 | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 4 | 4 | n/a | <1.00E+02 | 0.00E+00 | <1.00E+02 | <1.00E+02 |
| TDS | 4 | 0 | n/a | 5.07E+04 | 1.49E+03 | 5.32E+04 | 5.40E+04 |
| Temperature (°C) | 4 | 0 | n/a | 2.08E+01 | 2.28E+00 | 2.46E+01 | 2.74E+01 |
| TOC | 1 | 0 | n/a | 1.10E+03 | n/a | n/a | 1.10E+03 |
| Total Carbon | 4 | 0 | n/a | 1.43E+04 | 5.96E+02 | 1.53E+04 | 1.60E+04 |
| TOX (as Cl) | 4 | 0 | n/a | 4.32E+01 | 6.76E+00 | 5.43E+01 | 5.90E+01 |
| ²⁴² Cm (pCi/L) | 2 | 1 | DL | 4.56E-03 | 7.50E-04 | 6.87E-03 | 5.31E-03 |
| ¹³⁷ Cs (pCi/L) | 2 | 0 | n/a | 1.11E+00 | 6.18E-01 | 3.01E+00 | 1.73E+00 |

Table 3-2. B Plant Chemical Statistical
Wastestream Data.
(sheet 2 of 2)

| Constituent | N MDA Method | | | Mean | StdErr | 90%CILim | Maximum |
|--------------------------|--------------|---|-----|----------|----------|----------|----------|
| ¹⁴ C (pCi/L) | 2 | 1 | DL | 4.24E+00 | 7.35E-01 | 6.51E+00 | 4.98E+00 |
| ³ H (pCi/L) | 3 | 2 | DL | 1.59E+02 | 6.68E+01 | 2.85E+02 | 2.50E+02 |
| ⁹⁰ Sr (pCi/L) | 3 | 1 | DL | 1.44E-01 | 3.33E-02 | 2.07E-01 | 2.09E-01 |
| ²³⁴ U (pCi/L) | 3 | 0 | n/a | 1.60E-01 | 2.34E-02 | 2.04E-01 | 1.89E-01 |
| ²³⁸ U (pCi/L) | 3 | 0 | n/a | 1.37E-01 | 2.96E-03 | 1.43E-01 | 1.43E-01 |

NOTES:

N is equal to the number of number of test results available. Mean values, standard errors, confidence interval limits and maxima are in ppb (parts per billion) unless indicated otherwise.

The column headed MDA (Minimum Detectable Amount) is the number of results in each data set below the detection limit.

The column headed Method shows the MDA replacement method used: replacement by the detection limit (DL), replacement of single-valued MDAs by the log-normal plotting position method (LM), or replacement of multiple valued MDAs by the normal plotting position method (MR).

The column headed "90%CILim" (90% Confidence Interval Limit) is the lower limit of the one-tailed 90% confidence interval for all ignitability data sets and pH data sets with mean values below 7.25. For all other data sets it is the upper limit of the one-tailed 90% confidence interval.

The column headed "Maximum" is the minimum value in the data set for ignitability, the value furthest from 7.25 for pH, and the maximum value for all other analytes.

40,000 chemical constituents, each with a unique signature on a gas chromatography/mass spectrometer analysis. In addition, inductively coupled plasma and atomic absorption methods were used for the trace metals.

Sampling and monitoring of the BCE stream is provided to document the compliance with the discharge limits listed in the *Environmental Compliance* (WHC 1988a).

3.2.2 Raw Water Feed Data

This section contains information about 200 East Area raw and sanitary data. For the BCE report, only 200 East Area sanitary water was used as a background reference source (see Table 3-3).

The 200 East and West Areas are the major consumers of water delivered via the Export Water System. This system includes the buildings, pumps, valve houses, reservoirs, and distribution piping that deliver water from the Columbia River to the 200 East and West Areas. The river water is pumped into a 25-Mgal 182-B Reservoir for initial settling. The water is then transferred from the 182-B Reservoir to the individual 3-Mgal 200 East and West Area reservoirs for secondary settling. A backup capacity exists in 100-D Area. The raw water is then pumped directly to the raw water distribution piping and to the 283 Water Treatment Plants for sanitary water.

Currently, approximately 9-Mgal of both raw and sanitary water are used in the 200 East Area every 24 h. About one-half that amount (or 4.5 Mgal) are used in the 200 West Area. For both areas, raw water usage exceeds the sanitary water usage by a factor of 5 to 1. One-tenth of the sanitary water is used to produce steam.

As the water enters the 200 East and West treatment plants, on the way to becoming "sanitary water," chlorine is added for pretreatment, as needed, to control algae. Aluminum sulfate is added at a rate of 5% by weight, via a flash mixer, as a coagulant aide. The water is then fed into settling basins through flocculators that provide slow mixing to facilitate flocculation. The water then flows through the settling basins, at which time the flocced suspended particles are allowed to settle out.

The water then passes through multimedia filters to remove alum and other particulate matter still in suspension. The filters consist of layers of various grades of gravel, sand, and anthracite coal. The filters reduce turbidity to an average of 0.2 NTU. From the filters, the water flows to two 200,000-gal concrete-lined, covered reservoirs for disinfection. Chlorine is added to maintain a free chlorine residual of 1.5 mg/L.

In addition, each area has storage "high tanks" on the sanitary distribution system that contain 200,000 gal of water in each area. The high tanks serve to maintain pressure on the sanitary system if pumping pressure drops (as backup fire protection).

Table 3-3. Summary of 200 East Area Raw Water and Sanitary Water Data (1985-1988).

| Constituent/Parameter [all ppb, exceptions noted] | Raw Water ^a (1986-1987) | | | Sanitary Water ^b (1985-1988) | | |
|---|---------------------------------------|----------|----------|--|-----------|----------|
| | N ^c | AVG | STD DEV | N | AVG | STD DEV |
| Arsenic | | | | 4 | <5.00E+00 | NA |
| Barium | 5 | 2.80E+01 | 3.40E+00 | 4 | *1.05E+02 | 1.00E+01 |
| Cadmium | 5 | 2.40E+00 | 8.94E-01 | 4 | <5.00E-01 | NA |
| Calcium | 5 | 1.84E+04 | 1.47E+03 | | | |
| Chromium | | | | 4 | <1.00E+01 | NA |
| Chloride | 5 | 8.71E+02 | 2.37E+02 | 4 | 3.05E+03 | 6.76E+02 |
| Conductivity-field (μS) | 5 | 9.32E+01 | 4.61E+01 | | | |
| Copper | 5 | 1.06E+01 | 1.34E+00 | 4 | *2.50E+01 | 1.00E+01 |
| Color (units) | | | | 4 | <5.00E+00 | NA |
| Iron | 5 | 6.36E+01 | 2.57E+01 | 4 | *8.25E+01 | 5.19E+01 |
| Fluoride | | | | 4 | *1.13E+02 | 2.50E+01 |
| Lead | | | | 4 | <5.00E+00 | NA |
| Magnesium | 5 | 4.19E+03 | 4.83E+02 | | | |
| Manganese | 5 | 9.80E+00 | 3.49E+00 | 4 | <1.00E+01 | NA |
| Mercury | | | | 4 | <5.00E-01 | NA |
| Nickel | 5 | 1.04E+01 | 8.94E-01 | | | |
| Nitrate (as N) | 5 | 9.96E+02 | 8.79E+02 | 4 | *3.72E+02 | 5.44E+02 |
| pH (dimensionless) | 5 | 7.41E+00 | 1.18E+00 | | | |
| Potassium | 5 | 7.95E+02 | 6.24E+01 | | | |
| Selenium | | | | 4 | <5.00E+00 | NA |
| Silver | | | | 4 | <1.00E+01 | NA |
| Sodium | 5 | 2.26E+03 | 2.42E+02 | 4 | 2.28E+03 | 1.26E+02 |
| Sulfate | 5 | 1.06E+04 | 9.97E+02 | 4 | 1.68E+04 | 3.37E+03 |
| Temperature-field (C) | 5 | 1.64E+01 | 5.84E+00 | | | |
| TOC (μg/g) | 5 | 1.36E+03 | 2.53E+02 | | | |
| TDS (mg/L) | | | | 4 | 8.10E+01 | 1.69E+01 |
| Trichloromethane | 5 | 1.18E+01 | 4.02E+00 | | | |
| Uranium | 4 | 7.26E-01 | 2.22E-01 | | | |
| Zinc | 5 | 2.00E+01 | 2.12E+01 | 4 | <1.00E+02 | NA |
| Radionuclides (pCi/L) | | | | | | |
| Alpha Activity | 4 | 8.85E-01 | 5.30E-01 | | | |
| Beta Activity | 4 | 4.47E+00 | 1.76E+00 | | | |

NOTES: Averages denoted by an asterisk include a mix of above- and below-detection limit in computations when the actual values are below the detection limit.

See companion table for inorganic detection limits as compiled from Hanford Environmental Health Foundation.

^aCompiled from "Substance Toxicity Evaluation of Waste Data Base," provided by F. M. Jungfleisch (this data is an update of the data presented in WHC 1988, Preliminary Evaluation of Hanford Liquid Discharges to Ground, Westinghouse Hanford Company, Richland, Washington).

^bCompiled from HEHF 1986, Hanford Sanitary Water Quality Surveillance, CY 1985, HEHF-55, Hanford Environmental Health Foundation, Environmental Health Sciences, April 1986, and HEHF-59; HEHF-71; and HEHF-74 (corresponding reports for CY 1986, 1987, and 1988).

^cN is defined as the number of test results available for a particular analyte. N may reflect both single and multiple data sets.

ppb = parts per billion.

pCi/L = picoCuries/liter.

TOC = total organic carbon.

TOX = total organic halides.

TDS = Total Dissolved Solids.

μS = microsiemen.

μg = microgram.

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4.0 DATA OVERVIEW

This section presents a comparison of the characterization data obtained through both process knowledge and sampling. It will also provide estimates of the stream loadings for radionuclides and chemical constituents.

4.1 DATA COMPARISON

As explained in Section 2.0, chemical drains, water flushes, steam condensate, and other liquid effluents provide potential sources for the BCE system. When comparing process and sampling data for the BCE stream, a thorough review was made of present and past B Plant and WESF operating practices, which included questioning B Plant and other facility personnel. Process knowledge as well as 200 East Area sanitary water data were used as a background or reference point to compare against the sample data.

Table 4-1 provides a comparison of average constituent concentrations to various screening criteria. These criteria are not used here for compliance purposes.

4.2 STREAM DEPOSITION RATES

Table 4-2 has been included to provide deposition rates using the average data from Table 3-2, adjusted according to flow data from Section 2.2.

Table 4-1. Evaluation of B Plant Chemical
Sewage--Routine Operation.

| Constituent | Result ^a | SV1 ^b | SV2 ^c |
|-------------------------------------|---------------------|------------------|------------------|
| Barium | 2.9E-02 | 5.0E+00 g | |
| Chloride | 1.5E+00 | 2.5E+02 h | |
| Copper | 2.1E-02 | 1.0E+00 h | |
| Fluoride | 1.4E-01 | 2.0E+00 g | |
| Iron | 5.3E-02 | 3.0E-01 h | |
| Manganese | 5.7E-03 | 5.0E-02 h | |
| Sulfate | 1.1E+01 | 2.5E+02 h | |
| Zinc | 1.3E-02 | 5.0E+00 h | |
| Alpha Activity (pCi/L) ⁿ | 5.6E-01 | 1.5E+01 g | 3.0E+01 |
| Beta Activity (pCi/L) | 2.2E+00 | | 1.0E+03 |
| ²⁴² Cm (pCi/L) | 4.6E-03 | | 1.0E+03 |
| ¹³⁷ Cs (pCi/L) | 1.1E+00 | 1.0E+02 e | 3.0E+03 |
| ¹⁴ C (pCi/L) | 4.2E+00 | 3.0E+03 e | 7.0E+04 |
| ³ H (pCi/L) | 1.6E+02 | 9.0E+04 e | 2.0E+06 |
| ⁹⁰ Sr (pCi/L) | 1.4E-01 | 5.0E+01 e | 1.0E+03 |
| ²³⁴ U (pCi/L) | 1.6E-01 | | 5.0E+02 |
| ²³⁸ U (pCi/L) | 1.4E-01 | | 6.0E+02 |
| TDS | 5.1E+01 | 5.0E+02 h | |

^aUnits of results are mg/L unless indicated otherwise. The results are the mean values reported in the Statistics table of chapter 3.

^bScreening Value 1 (SV1) lists the value first, basis second and an asterisk (*) third if the result exceeds the regulatory value. The basis is the proposed primary MCL (e), the proposed secondary MCL (f), the primary MCL (g), or the secondary MCL (h). The value is the smaller of two MCLs: the proposed primary MCL (or the primary MCL as a default) or the proposed secondary MCL (or the secondary MCL as a default). See WHC-EP-0342, "Hanford Site Stream-Specific Reports", August 1990.

^cScreening Value 2 (SV2) lists the value first and an asterisk (*) second if the result exceeds the SV2). These values are derived concentration guides obtained from Appendix A of WHC-CM-7-5, "Environmental Compliance Manual," Revision 1, January 1990.

ⁿThe SV1 and SV2 values for Gross Alpha are used to evaluate Alpha Activity.

^oThe SV2 for Gross Beta is used to evaluate Beta Activity.

Table 4-2. Deposition Rate for B Plant
Chemical Sewage--Routine Operation.
Flowrate: 2.18 E+07 L/mo

| Constituent | Kg/L* | Kg/mo* |
|---------------------|----------|----------|
| Barium | 2.92E-08 | 6.36E-01 |
| Boron | 1.85E-08 | 4.03E-01 |
| Calcium | 1.84E-05 | 4.01E+02 |
| Chloride | 1.50E-06 | 3.27E+01 |
| Copper | 2.12E-08 | 4.62E-01 |
| Fluoride | 1.39E-07 | 3.03E+00 |
| Iron | 5.32E-08 | 1.16E+00 |
| Magnesium | 4.15E-06 | 9.04E+01 |
| Manganese | 5.75E-09 | 1.25E-01 |
| Potassium | 8.01E-07 | 1.75E+01 |
| Silicon | 2.32E-06 | 5.06E+01 |
| Sodium | 2.12E-06 | 4.62E+01 |
| Strontium | 9.62E-08 | 2.10E+00 |
| Sulfate | 1.11E-05 | 2.42E+02 |
| Uranium | 4.71E-10 | 1.03E-02 |
| Zinc | 1.27E-08 | 2.77E-01 |
| Acetone | 1.12E-08 | 2.44E-01 |
| Ammonia | 5.52E-08 | 1.20E+00 |
| Unknown amide | 2.30E-08 | 5.01E-01 |
| Alpha Activity * | 5.55E-13 | 1.21E-05 |
| Beta Activity * | 2.18E-12 | 4.75E-05 |
| TDS | 5.07E-05 | 1.11E+03 |
| TOC | 1.10E-06 | 2.40E+01 |
| Total Carbon | 1.43E-05 | 3.12E+02 |
| TOX (as Cl) | 4.32E-08 | 9.42E-01 |
| ²⁴² Cm * | 4.56E-15 | 9.94E-08 |
| ¹³⁷ Cs * | 1.11E-12 | 2.42E-05 |
| ¹⁴ C * | 4.24E-12 | 9.24E-05 |
| ³ H * | 1.59E-10 | 3.47E-03 |
| ⁹⁰ Sr * | 1.44E-13 | 3.14E-06 |
| ²³⁴ U * | 1.60E-13 | 3.49E-06 |
| ²³⁸ U * | 1.37E-13 | 2.99E-06 |

Data collected from October 1989 through March 1990. Flowrate is the average of rates from chapter 2. Constituent concentrations are average values from the Statistics Report in chapter 3. Concentration units of flagged (*) constituents are reported as curies per liter. Deposition rate units of flagged (*) constituents are reported as curies per month.

5.0 PROPOSED DESIGNATION

This section proposes that the BCE stream not be designated a dangerous waste. This proposed designation uses data from both the effluent source description and present (i.e., October 1989 to March 1990) sample data (Sections 2.0 through 4.0) and complies with the designation requirements of WAC 173-303-070 (Ecology 1989).

The procedure for determining whether a waste is a dangerous or extremely hazardous waste is contained in the Washington State *Dangerous Waste Regulations* (WAC 173-303-070). This procedure is illustrated in Figure 5-1 and includes the following:

- Dangerous Waste Lists (WAC 173-303-080)
- Dangerous Waste Criteria (WAC 173-303-100)
- Dangerous Waste Characteristics (WAC 173-303-090).

5.1 DANGEROUS WASTE LISTS

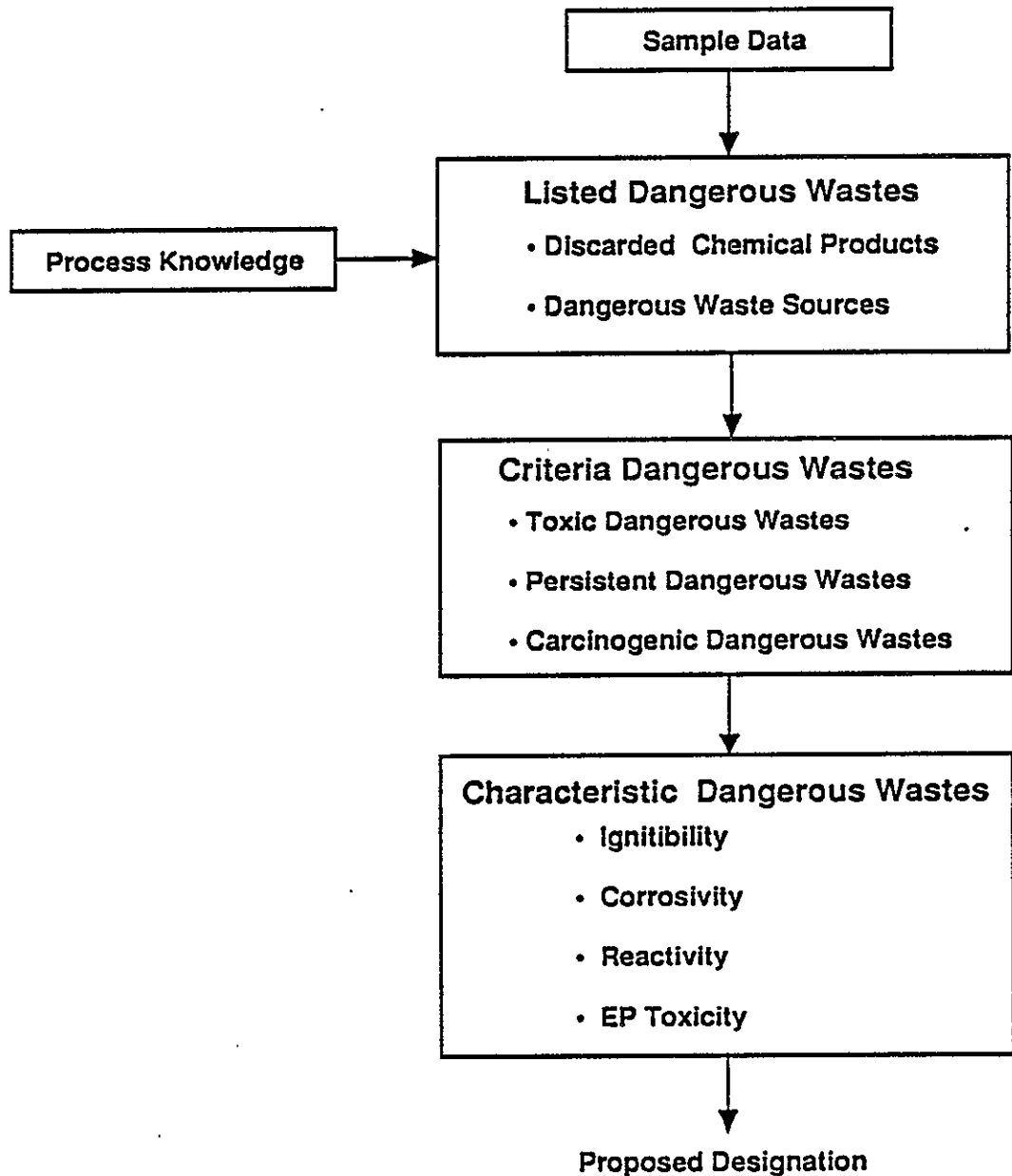
A waste is considered a listed dangerous waste if it either contains a discarded chemical product (WAC 173-303-081) or originates from a dangerous waste source (WAC 173-303-082). The proposed designation was based on a combination of process knowledge and present sampling data.

5.1.1 Discarded Chemical Products

A wastestream constituent is a discarded chemical product (WAC 173-303-081) if it is listed in WAC 173-303-9903 and is characterized by one or more of the following descriptions.

- The listed constituent was the sole active ingredient in a commercial chemical product that had been discarded. Commercial chemical products that, as purchased, contained two or more active ingredients were not designated as discarded chemical products. Products that contained nonactive components such as water, however, were designated if the sole active ingredient in the mixture was listed in WAC 173-303-9903.
- The constituent results from a spill of unused chemicals. (A spill of a discarded chemical product would cause a wastestream to be designated during the time that the discharge is occurring. The approach taken is that the current wastestream would not be designated unless a review of past spill events indicates that the spills are predictable, systematic events that are ongoing or are reasonably anticipated to occur in the future. In this report,

Figure 5-1. Illustration of the Designation Procedure.



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the evaluation of this criterion is based on a review of spill data reported in accordance with the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*).

- The constituent is discarded in the form of a residue resulting from cleanup of a spill of an unused commercial chemical product on the discarded chemical products list. (A chemical product that is used in a process and then released to the wastestream is not a discarded chemical product. Offspecification, unused chemicals, and chemicals that have exceeded a shelf life but have not been used are considered discarded chemical products when not disposed of in accordance with the regulations).

5.1.2 Dangerous Waste Sources

A list of dangerous waste sources is contained in WAC 173-303-9904, pursuant to WAC 173-303-082 (Ecology 1989). There are three major categories of sources in WAC 173-303-9904. The first is nonspecific sources from routine maintenance operations occurring at many industries. The second is specific sources (e.g., wastes from ink formulation, etc.). The third is state sources, which is limited to polychlorinated biphenyl-contaminated transformers and capacitors resulting from salvaging, rebuilding, or discarding activities.

Of the nonspecific sources, only F001 (specific spent halogenated degreasing solvents), F002 (specific spent halogenated solvents), F003 (specific spent nonhalogenated solvents), and F005 (specific spent nonhalogenated solvents) could apply to the BCE stream.

5.2 LISTED WASTE DATA CONSIDERATIONS

The proposed designation of the wastestream described in this report is based on an evaluation of process and sampling data. The following sections describe the types of information used in this designation.

5.2.1 Process Evaluation

The process evaluation began with a thorough review of the processes contributing to the wastestream. Processes were reviewed and compared with the discarded chemical products list and the dangerous waste source list. This process evaluation is necessary because the stream could be a listed waste if a listed waste was known to have been added at any upstream location, even if a listed constituent was not detected at the sample point. The process evaluation included a review of the following information sources:

- Material Safety Data Sheets

- *Superfund Amendments and Reauthorization Act* Title III inventory reports
- Operating procedures
- Process chemical inventories
- Physical inspections, where possible.

Additionally, appropriate interviews with facility personnel were conducted to determine if there were any procedures or laboratory processes that generated a listed waste not evident during other portions of the process evaluation.

If a listed chemical was identified, the specific use of the chemical was evaluated to determine if such use resulted in the generation of a listed waste.

5.2.2 Sampling Data

Present sampling data were used as screening tools to enhance and support the results of the process evaluation. This screening compared the results of the sampling data with the WAC 173-303-9903 and 9904 lists. If a constituent was cited on one or both of these lists, an engineering evaluation was performed to determine if the constituent had entered the wastestream as a discarded chemical product or came from a dangerous waste source.

Screening organic constituents is a relatively simple procedure because analytical data for organic constituents are reported as substances and are easily compared to the WAC 173-303-9903 and -9904 lists. It is not as simple to screen inorganic analytical data because inorganic data are reported as ions rather than as substances. For example, an analysis may show that a wastestream contains the cations sodium and calcium along with the anions chloride and nitrate. The possible combinations of substances include: sodium chloride, sodium nitrate, calcium chloride, and calcium nitrate. In a situation with many cations and anions, however, the list of possible combinations is extensive.

A procedure was developed by Westinghouse Hanford Company for combining the inorganic constituents into substances. This screening procedure is described in WHC (1990b) and is intended to be a tool in the evaluation of a wastestream. The listing of the inorganic substances developed by this screening procedure is not intended to be an indication that the substance was discharged to the wastestream, only that the necessary cations and anions are present and an investigation should be conducted to determine how they entered the wastestream.

5.3 PROPOSED LISTED WASTE DESIGNATION

A process evaluation, along with a review of sampling data, indicated that the BCE did not contain a discarded chemical product or a listed waste source. The following sections discuss the evaluation that was conducted to substantiate this conclusion.

5.3.1 Discarded Chemical Products

As discussed in Section 5.2, a process evaluation of the contributors to the BCE was conducted. This evaluation included a review of Material Safety Data Sheets at the plant for the BCE stream (see Appendix A) and chemical inventories compiled for compliance with the *Superfund Authorization and Recovery Act* Title III requirements for possible listed waste contributors.

Table 5-1 contains a listing of the two potential discarded chemical products, hydrogen fluoride and acetone, identified from sampling data (using the screening procedure described in Section 5.2). Of these two compounds, only one (acetone) was identified as being present in the facility during the process evaluation.

A thorough review including facility interviews and inspections produced no evidence that discharges of these two chemical products into the BCE stream had occurred.

A review of plant operating procedures produced evidence to preclude the introduction of any of these substances into the BCE stream. In addition, the substances detected were not used in past process practices for the BCE stream.

The potential discarded chemical product identified in both the process evaluation and in the screening of the sampling data was acetone.

Based on the considerations and data presented in the following sections, the wastestream does not contain any discarded chemical products.

5.3.1.1 Hydrogen Fluoride. A thorough review of plant chemical inventory data and interviews with plant personnel did not show hydrogen fluoride to be present in any chemical compound used within B Plant.

Hydrogen fluoride (U134) is a possible compound formed from the combination of ion analytes. The presence or absence of this compound is dependent on the source of fluoride because hydrogen is commonly found in the wastewater. Fluoride was detected in four of the four samples (ion specific electrode [ISE] method) at an average concentration level of 139 ppb. The rejection criteria for hydrogen fluoride based on sanitary water supplies is less than 143 ppb as presented in Section 5.2 of WHC-EP-0342. As the average concentration seen in this sample is less than or approximating the rejection criteria, this data will not be considered in the designation of

Finding: Undesignated

Discarded Chemical Products - WAC 173-303-081

| Substance | Review Number | Status | DW Number |
|-------------------|---------------|---------------|--------------|
| Hydrogen fluoride | U134(DW) | Not Discarded | Undesignated |
| Acetone | U002(DW) | Not Discarded | Undesignated |

Dangerous Waste Sources - WAC 173-303-082

| Substance | Review Number | Status | DW Number |
|-----------|---------------|-----------------|--------------|
| Acetone | F003 | Unlisted Source | Undesignated |

Infectious Dangerous Waste - WAC 173-303-083

No regulatory guidance

Dangerous Waste Mixtures - WAC 173-303-084

| Substance | Toxic | Persistant | | Carcinogenic |
|---------------------|--------------|--------------|--------------|--------------|
| | EC% | HHZ | PAH% | Total% |
| Barium chloride | 4.65E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Calcium tetraborate | 4.22E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Copper(II) chloride | 6.30E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Iron(III) fluoride | 1.39E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Magnesium chloride | 7.01E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Magnesium sulfate | 1.23E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Potassium fluoride | 1.08E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sodium metasilicate | 6.00E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zinc sulfate | 3.65E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acetone | 1.33E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ammonia | 6.38E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Total | 1.21E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| DW Number | Undesignated | Undesignated | Undesignated | Undesignated |

Dangerous Waste Characteristics - WAC 173-303-090

| Characteristic | Value | DW Number |
|----------------------------|-----------|--------------|
| Ignitability (Degrees F) | >206 | Undesignated |
| Corrosivity-pH | 7.67 | Undesignated |
| Reactivity Cyanide (mg/kg) | <1.00E+02 | Undesignated |
| Reactivity Sulfide (mg/kg) | <1.00E+02 | Undesignated |
| EP Toxic Arsenic (mg/L) | <5.00E-01 | Undesignated |
| EP Toxic Barium (mg/L) | <1.00E+00 | Undesignated |
| EP Toxic Cadmium (mg/L) | <1.00E-01 | Undesignated |
| EP Toxic Chromium (mg/L) | <5.00E-01 | Undesignated |
| EP Toxic Lead (mg/L) | <5.00E-01 | Undesignated |
| EP Toxic Mercury (mg/L) | <2.00E-02 | Undesignated |
| EP Toxic Selenium (mg/L) | <5.00E-01 | Undesignated |
| EP Toxic Silver (mg/L) | <5.00E-01 | Undesignated |

Dangerous Waste Criteria - WAC 173-303-100

| Substance | Toxic | Persistant | | Carcinogenic |
|---------------------|----------|------------|----------|---------------------------|
| | EC% | HHZ | PAH% | Total% DW Number-Positive |
| Barium chloride | 4.65E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Calcium tetraborate | 4.22E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Copper(II) chloride | 6.30E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Iron(III) fluoride | 1.39E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Magnesium chloride | 7.01E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Table 5-1. Dangerous Waste Designation Report.
(sheet 1 of 2)

Table 5-1. Dangerous Waste Designation Report.
(sheet 2 of 2)

Dangerous Waste Criteria - WAC 173-303-100 - Continued

| Substance | Toxic | Persistent | | Carcinogenic |
|---------------------|--------------|--------------|--------------|---------------------------|
| | EC% | HH% | PAH% | Total% DW Number-Positive |
| Magnesium sulfate | 1.23E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Potassium fluoride | 1.08E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sodium metasilicate | 6.00E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zinc sulfate | 3.65E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acetone | 1.33E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ammonia | 6.38E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Total | 1.21E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| DW Number | Undesignated | Undesignated | Undesignated | Undesignated |

Dangerous Waste Constituents - WAC 173-303-9905

Substance
Hydrogen fluoride
Acetone
Barium and compounds,NOS

Substance names may include MB (monobasic), DB (dibasic), or TB (tribasic) to identify the equivalence of hydrogen ion that have been neutralized from polyprotic weak acids to form their conjugate bases.

Results based on a single datum are noted by an asterisk (*). Others are based on the lower limit of the one-tailed 90% confidence interval for pH data sets with mean values below 7.25 or by the upper limit of the one-tailed 90% confidence interval for all other data sets.

EP Toxic contaminants, ignitability, and reactivity are reported by standard methods when available. In the absence of EP Toxicity data, total contaminant concentrations are evaluated. In lieu of closed cup ignition results, ignitability is estimated from the sum of the contributions of all substances that are ignitable when pure. A waste is flagged as dangerous if sum of the ignitable substances exceeds one percent. Reactivity is by SW-846: 250 mg of cyanide as hydrogen cyanide per kg of waste or 500 mg of sulfide as hydrogen sulfide per kg of waste. Total cyanide and total sulfide are used in lieu of amenable cyanide and amenable sulfide.

Inorganic substances are formulated and their possible concentrations calculated for designation purposes only. The actual existence in the waste of these substances is not implied and should not be inferred.

the wastestream as it is likely that hydrogen fluoride is present in these samples due to the presence of fluoride in the water supply. In addition, increased concentration of fluoride will occur due to evaporative cooling losses as discussed in Section 2.3.3. Because this potential compound has no identified source, it is not considered to be a discarded chemical product in the BCE stream.

5.3.1.2 Acetone. Acetone (U002) is used in B Plant by maintenance and operations as a solvent to remove impurities (e.g., adhesive and grease) from various surfaces. Because of the potential of fire hazards, the use of acetone is tightly controlled to limit the amount of material present. Interviews with personnel in maintenance and operations and reviews of the procedures in place for disposal of spent chemicals in these areas provided no evidence that acetone had been disposed of as the sole active ingredient in an unused or out-of-specification chemical product.

Acetone appeared in one of the four BCE routine operation samples at a concentration of 15 ppb. The rejection criteria for acetone based on blank analysis is less than 37 ppb as presented in Section 5.2 of WHC-EP-0342. As the concentration of acetone seen in this sample is less than the rejection criteria, this data will not be considered in the designation of the wastestream as it is likely that acetone is present in this wastestream sample because of sample contamination.

In addition, acetone was seen in both the transfer and trip blanks on the same day as the detection listed previously. Because the trip and transfer blanks had concentrations of 21 ppb and 14 ppb, respectively, it is apparent that laboratory contamination is the source of this spent solvent. This potential compound is not considered to be a discarded chemical product in the BCE stream.

5.3.2 Dangerous Waste Sources

The process evaluation (see Section 5.2) was also used to determine if the wastestream included any specific waste sources (K and W wastes) or any nonspecific waste sources (F wastes) listed in WAC 173-303-9904.

Sampling data were utilized to enhance the process evaluation. One potential listed solvent was identified by the sampling data; this was acetone. Acetone appears on the B Plant chemical inventories.

Based on the discussion and data presented in the following sections, it is concluded that the wastestream does not have a dangerous waste source.

5.3.2.1 Acetone. As discussed in Section 5.3.1.2, acetone (F003) is used as a solvent at B Plant. No source for the entry of waste acetone into BCE was found to exist at B Plant. It is also concluded that acetone was present in the BCE samples as a result of sample contamination (see Section 5.3.1.2).

5.4 DANGEROUS WASTE CRITERIA

A waste is considered a dangerous waste if it meets any of the following criteria categories (WAC 173-303-100) (Ecology 1989): toxic dangerous waste, persistent dangerous waste, or carcinogenic dangerous waste. A description of the methods used to test the sampling data against the criteria is contained in WHC (1990b). Summaries of the methods, along with the results, are contained in the following sections.

Table 5-2 shows how ion analytes were assigned to neutral substances that are required for designation. The table accounts for charge balancing the ion assemblage (from Table 3-2 [the statistical summary]) and the subsequent formulation of neutral substances. A detailed discussion can be found in WHC (1990b).

5.4.1 Toxic Dangerous Wastes

The procedure for determining if a wastestream is a toxic dangerous waste is as follows (WAC 173-303-101).

- Collect and analyze multiple samples from the wastestream.
- Calculate the upper limit of the one-sided 90%CI for each analyte in the wastestream.
- Formulate substances from the analytical data. NOTE: This step is only required for inorganic analytes because it is not possible to complete the evaluation based on the concentration of cations and anions. This methodology is described in WHC (1990b) and is based on an evaluation of the most toxic substances that can exist in an aqueous environment under normal temperatures and pressures.
- Assign toxic categories to the neutral substances formulated for the wastestream.
- Calculate the contribution of each substance to the percent equivalent concentration (EC%).
- Calculate the EC% by summing the contributions of each substance.
- Designate the wastestream as a toxic dangerous waste if the EC% is greater than 0.001%, per WAC 173-303-9906.

Eleven substances potentially present in the BCE stream were determined to have toxic categories associated with them. These substances are listed in Table 5-1. The individual and sum EC% values for these substances are also listed in Table 5-1. Because the EC% sum is $1.21 \text{ E-}06$, which is less than the cutoff of 0.001%, the wastestream is not a toxic dangerous waste.

Table 5-2. Inorganic Chemistry for B Plant Chemical
Sewage--Routine Operation.
(sheet 1 of 2)

| Constituent | ppb | Ion | Eq/g | Normalized |
|-----------------------------------|----------|------------|------------|------------|
| Charge normalization: | | | | |
| Barium | 3.06E+01 | Ba+2 | 4.46E-10 | |
| Boron | 3.14E+01 | B4O7-2 | 1.45E-09 | 4.32E-09 |
| Calcium | 1.88E+04 | Ca+2 | 9.38E-07 | |
| Chloride | 1.77E+03 | Cl-1 | 4.99E-08 | 1.49E-07 |
| Copper | 2.98E+01 | Cu+2 | 9.37E-10 | |
| Fluoride | 1.42E+02 | F-1 | 7.45E-09 | 2.22E-08 |
| Iron | 6.87E+01 | Fe+3 | 3.69E-09 | |
| Magnesium | 4.28E+03 | Mg+2 | 3.52E-07 | |
| Manganese | 6.53E+00 | Mn+2 | 2.38E-10 | |
| Potassium | 8.87E+02 | K+1 | 2.27E-08 | |
| Silicon | 2.42E+03 | SiO3-2 | 1.72E-07 | 5.14E-07 |
| Sodium | 2.26E+03 | Na+1 | 9.83E-08 | |
| Strontium | 1.02E+02 | Sr+2 | 2.32E-09 | |
| Sulfate | 1.18E+04 | SO4-2 | 2.45E-07 | 7.29E-07 |
| Uranium | 5.35E-01 | UO2+2 | 4.49E-12 | |
| Zinc | 1.48E+01 | Zn+2 | 4.53E-10 | |
| Hydrogen Ion (from pH 7.7) | | H+ | (2.14E-11) | |
| Hydroxide Ion (from pH) | | OH- | (4.66E-10) | |
| Cation total | | | 1.42E-06 | |
| Anion total | | | 4.76E-07 | |
| Anion normalization factor: 2.979 | | | | |
| Substance formation: | | | | |
| Substance | % | Cation Out | Anion Out | |
| Copper(II) chloride | 6.30E-06 | 0.00E+00 | 1.48E-07 | |
| Iron(III) fluoride | 1.39E-05 | 0.00E+00 | 1.85E-08 | |
| Potassium fluoride | 1.08E-04 | 4.17E-09 | 0.00E+00 | |
| Barium chloride | 4.65E-06 | 0.00E+00 | 1.47E-07 | |
| Zinc sulfate | 3.65E-06 | 0.00E+00 | 7.29E-07 | |
| Magnesium chloride | 7.01E-04 | 2.05E-07 | 0.00E+00 | |
| Calcium tetraborate | 4.22E-05 | 9.34E-07 | 0.00E+00 | |
| Magnesium sulfate | 1.23E-03 | 0.00E+00 | 5.24E-07 | |
| Sodium metasilicate | 6.00E-04 | 0.00E+00 | 4.15E-07 | |
| Potassium metasilicate | 3.22E-05 | 0.00E+00 | 4.11E-07 | |
| Manganese(II) metasilicate | 1.56E-06 | 0.00E+00 | 4.11E-07 | |
| Strontium sulfate | 2.13E-05 | 0.00E+00 | 5.21E-07 | |
| Uranyl sulfate | 8.23E-08 | 0.00E+00 | 5.21E-07 | |
| Calcium sulfate | 3.55E-03 | 4.12E-07 | 0.00E+00 | |

Table 5-2. Inorganic Chemistry for B Plant Chemical
Sewage--Routine Operation.
(sheet 2 of 2)

Statistics based on a single datum are noted by an asterisk (*). With the exception of hydrogen ion and hydroxide, others report the upper limit of the one-tailed 90% confidence interval. Hydrogen ion is based on the lower limit of the one-tailed 90% confidence interval for pH sets with mean values below 7.25 and on the upper limit of the one-tailed 90% confidence interval for pH data sets with mean values of 7.25 or higher. The hydroxide magnitude is equal to $1.00\text{E-}20 \text{ (Eq/g)}^{**2}$ divided by the hydrogen ion value (in Eq/g).

Ion concentrations in equivalents per gram (Eq/g) are based on the statistic. Conversions include scale (ppb to g/g), molecular weight (constituent form to ionic form), and equivalents (charges per ion). The column headed "Normalized" shows normalized concentrations (also in Eq/g) calculated by increasing concentrations of cations, excluding Hydrogen ion, or anions, excluding hydroxide, by the normalization factor. The normalization factor is the larger of the cation total, including Hydrogen ion, or anion total, including hydroxide, divided by the smaller total.

Substance names may include MB (monobasic), DB (dibasic), TB (tribasic) to identify the equivalents of hydrogen ion that have been neutralized from polycrotic weak acids to form their conjugate bases.

Substances are formulated in the order listed. The column headed "%" is the percent of the substance in the waste (gms/100gms). Substances formulated with oxygen are based on the residual concentration of the counterion. Other substance concentrations are based on the limiting residual concentration of the cation or anion. The columns headed "Cation Out" and "Anion Out" indicate the residual concentrations (in Eq/g) of each ion after a substance concentration has been calculated.

5.4.2 Persistent Dangerous Wastes

The procedure for determining if a wastestream is a persistent dangerous waste is as follows (WAC 173-303-102).

- Collect multiple grab samples of the wastestream.
- Determine which substances in the wastestream are halogenated hydrocarbons (HH) and which are polycyclic aromatic hydrocarbons (PAH).
- Determine the upper limit of the one-sided 90%CI for the substances of interest.
- Calculate the weight percent (wt%) contribution of each HH% and PAH%.
- Sum the resulting weight percent of the contributor HH% and PAH%.
- Designate the wastestream as persistent if the weight percent contribution of the HH% is greater than 0.01% or if the weight percent contribution of the PAH% is greater than 1.0%, per WAC 173-303-9907.

No substance potentially present in the BCE stream was determined to be HH and no chemical compounds were determined to be PAH. Therefore, the BCE stream is not a persistent dangerous waste.

5.4.3 Carcinogenic Dangerous Wastes

The procedure for determining if a wastestream is a carcinogenic dangerous waste is as follows (WAC 173-303-103).

- Collect multiple grab samples of the wastestream.
- Determine the upper limit of the one-sided 90%CI for the substances of interest.
- Formulate neutral substances from the analytical data.
NOTE: This step is only required for inorganic analytes because it is not possible to complete the evaluation based on the concentrations of cations and anions. This methodology is described in WHC (1990b) and is based on an evaluation of the carcinogenic substances that can exist in an aqueous environment under normal temperatures and pressures.
- Determine which substances in the wastestream are human or animal carcinogens according to the International Agency for Research on Cancer (IARC).

- Calculate the weight percent concentration for each carcinogen.
- Sum the resulting weight percent contributions.
- Designate the wastestream as carcinogenic if any of the positive carcinogens are above 0.01% or if the total concentration for positive and suspected carcinogens is above 1.0%.

No substance potentially present in the BCE stream was determined to be carcinogenic chemical compounds. The BCE is not a carcinogenic dangerous waste.

5.5 DANGEROUS WASTE CHARACTERISTICS

A waste is considered a dangerous waste if it is ignitable, corrosive, reactive, or extraction procedure (EP) toxic (WAC 173-303-090). A description of the methods used to evaluate the data in terms of these characteristics is contained in WHC (1990b). Summaries of the methods, along with the results, are contained in the following sections.

5.5.1 Ignitability

The lowest flashpoint of any substance found in the BCE was greater than 206 °F. Therefore, the BCE is not an ignitable waste.

5.5.2 Corrosivity

A waste is a corrosive dangerous waste if the stream exhibited a pH of ≤ 2.0 or ≥ 12.5 . The comparison to this characteristic was based on the lower limit of the 90%CI for a stream with a mean value of pH < 7.25 and the upper limit of the one-sided 90%CI for a stream with a mean value of pH ≥ 7.25 . Because the 90% CI of the pH for the wastestream is 7.67, the wastestream is not a corrosive dangerous waste per WAC 173-303-090(6).

5.5.3 Reactivity

An aqueous waste is reactive if the waste contains an amount of cyanide or sulfide that, under modified conditions, could threaten human health or the environment (WAC 173-303-090(7)). A revision to *Test Methods for Evaluating Solid Wastes* (EPA 1986) provides more quantitative indicator levels for cyanide and sulfide. It states that levels of (equivalent) cyanide as hydrogen cyanide below 250 mg/kg or of (equivalent) sulfide as hydrogen sulfide below 500 mg/kg would not be considered reactive.

Total cyanide and total sulfide equivalent concentrations are below 100 mg/kg the detection limit with less than values given. Therefore, this wastestream is not a reactive dangerous waste.

5.5.4 Extraction Procedure Toxicity

A waste is an EP toxic dangerous waste if contaminant results from EP toxicity testing exceed the limits of WAC 173-303-090(8)(c). In the absence of specific EP toxicity test results, total analyte concentrations are used.

No analytes with concentrations above detection limits are on the EP toxic list in the BCE stream. Therefore, the BCE (routine operation) stream is not an EP toxic dangerous waste.

5.6 PROPOSED DESIGNATIONS

Because the BCE stream does not contain any dangerous waste, as defined in WAC 173-303-070, it is proposed that the wastestream not be designated a dangerous waste.

6.0 ACTION PLAN

This section addresses recommendations for future waste characterization tasks for the liquid effluents that are within the scope of the *Liquid Effluent Study Characterization Data* (WHC 1990a). The final extent of, and schedule for, any recommended tasks are subject to negotiation between the Ecology, EPA, and DOE. An implementation schedule for the completion of these tasks will give consideration to other compliance actions already under way as part of the Tri-Party Agreement (Ecology et al. 1989), and on the availability of funding. All effluent monitoring and sampling will be conducted according to DOE Order 5400.1 (*General Environmental Protection Program*, issued November 9, 1988) (DOE 1988).

6.1 FUTURE SAMPLING

The random sampling conducted during the October 1989 to March 1990 period covered the routine operation process configuration of the BCE. Configurations related to regeneration of the ion exchange column (i.e., anion and cation regenerate) were not taken. Future sampling should be performed during operation of the anion and cation regenerate configurations.

6.2 TECHNICAL ISSUES

As described in Section 2.0, the BCE stream was sampled at the 216-B-63 Ditch. This sample point was chosen because it is a common, accessible location downstream of all the contributing wastestreams.

The samples collected at this point are considered to be representative of the types of constituents present in the contributing wastestream during routine operation. As a result, the characterization data presented in this report is considered to be representative of the effluent stream during the routine operation configuration.

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APPENDIX A

PROCESS INFORMATION

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Appendix A. Potential Chemicals.

| Chemical | Hazardous Constituents | Hanford MSDS Number |
|---|---|------------------------|
| Sulfuric acid, | Sulfuric acid 93-99 wt% | 1529A |
| Sodium hydroxide | Sodium hydroxide 100 wt% | 1497B |
| Sodium carbonate, anhydrous | None listed | 1473 |
| Sodium bicarbonate, baking soda | None listed | 1480 |
| Monosodium phosphate, sodium diphosphate | None listed | 1360 |
| Dearborn*-727 | Potassium hydroxide less than 10 wt% | 17342 |
| Dearborn*-730 | Trichloro-s-triazinetriene 99 wt% | 10770 |
| IWT C-211 cation exchange resin (styrene/divinylbenzene copolymer) | None listed | 14925 |
| IWT A-264 anion exchange resin | None listed | 21902 |

*Dearborn is a trademark of W. R. Grace & Co., Lake Zurich, Illinois.

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APPENDIX B

**SAMPLING DATA FOR B PLANT
CHEMICAL SEWER**

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Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 1 of 7)

| Constituent | Sample # | Date | Method | Result |
|---------------------|----------|----------|--------|-----------|
| Arsenic (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Arsenic (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Arsenic (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Arsenic (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Barium | 50705 | 10/19/89 | ICP | 2.90E+01 |
| Barium | 50752 | 11/02/89 | ICP | 3.00E+01 |
| Barium | 50756 | 11/03/89 | ICP | 3.10E+01 |
| Barium | 50984 | 2/27/90 | ICP | 2.70E+01 |
| Barium (EP Toxic) | 50705E | 10/19/89 | ICP | <1.00E+03 |
| Barium (EP Toxic) | 50752E | 11/02/89 | ICP | <1.00E+03 |
| Barium (EP Toxic) | 50756E | 11/03/89 | ICP | <1.00E+03 |
| Barium (EP Toxic) | 50984E | 2/27/90 | ICP | <1.00E+03 |
| Boron | 50705 | 10/19/89 | ICP | <1.00E+01 |
| Boron | 50752 | 11/02/89 | ICP | 1.00E+01 |
| Boron | 50756 | 11/03/89 | ICP | 1.20E+01 |
| Boron | 50984 | 2/27/90 | ICP | 4.20E+01 |
| Cadmium (EP Toxic) | 50705E | 10/19/89 | ICP | <1.00E+02 |
| Cadmium (EP Toxic) | 50752E | 11/02/89 | ICP | <1.00E+02 |
| Cadmium (EP Toxic) | 50756E | 11/03/89 | ICP | <1.00E+02 |
| Cadmium (EP Toxic) | 50984E | 2/27/90 | ICP | <1.00E+02 |
| Calcium | 50705 | 10/19/89 | ICP | 1.86E+04 |
| Calcium | 50752 | 11/02/89 | ICP | 1.89E+04 |
| Calcium | 50756 | 11/03/89 | ICP | 1.84E+04 |
| Calcium | 50984 | 2/27/90 | ICP | 1.79E+04 |
| Chloride | 50705 | 10/19/89 | IC | 1.90E+03 |
| Chloride | 50752 | 11/02/89 | IC | 1.50E+03 |
| Chloride | 50756 | 11/03/89 | IC | 1.50E+03 |
| Chloride | 50984 | 2/27/90 | IC | 1.10E+03 |
| Chromium (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Chromium (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Chromium (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Chromium (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Copper | 50705 | 10/19/89 | ICP | 1.30E+01 |
| Copper | 50752 | 11/02/89 | ICP | 2.10E+01 |
| Copper | 50756 | 11/03/89 | ICP | 3.60E+01 |
| Copper | 50984 | 2/27/90 | ICP | 1.50E+01 |
| Fluoride | 50705 | 10/19/89 | IC | <5.00E+02 |
| Fluoride | 50705 | 10/19/89 | ISE | 1.40E+02 |
| Fluoride | 50752 | 11/02/89 | IC | <5.00E+02 |
| Fluoride | 50752 | 11/02/89 | ISE | 1.43E+02 |
| Fluoride | 50756 | 11/03/89 | IC | <5.00E+02 |
| Fluoride | 50756 | 11/03/89 | ISE | 1.36E+02 |
| Fluoride | 50984 | 2/27/90 | IC | <5.00E+02 |
| Fluoride | 50984 | 2/27/90 | ISE | 1.37E+02 |
| Iron | 50705 | 10/19/89 | ICP | 4.60E+01 |
| Iron | 50752 | 11/02/89 | ICP | <3.00E+01 |

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Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 2 of 7)

| Constituent | Sample # | Date | Method | Result |
|---------------------|----------|----------|--------|-----------|
| Iron | 50756 | 11/03/89 | ICP | 6.70E+01 |
| Iron | 50984 | 2/27/90 | ICP | 7.00E+01 |
| Lead (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Lead (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Lead (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Lead (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Magnesium | 50705 | 10/19/89 | ICP | 4.09E+03 |
| Magnesium | 50752 | 11/02/89 | ICP | 4.32E+03 |
| Magnesium | 50756 | 11/03/89 | ICP | 4.23E+03 |
| Magnesium | 50984 | 2/27/90 | ICP | 3.95E+03 |
| Manganese | 50705 | 10/19/89 | ICP | 7.00E+00 |
| Manganese | 50752 | 11/02/89 | ICP | <5.00E+00 |
| Manganese | 50756 | 11/03/89 | ICP | 6.00E+00 |
| Manganese | 50984 | 2/27/90 | ICP | <5.00E+00 |
| Mercury (EP Toxic) | 50705E | 10/19/89 | CVAA/M | <2.00E+01 |
| Mercury (EP Toxic) | 50752E | 11/02/89 | CVAA/M | <2.00E+01 |
| Mercury (EP Toxic) | 50756E | 11/03/89 | CVAA/M | <2.00E+01 |
| Mercury (EP Toxic) | 50984E | 2/27/90 | CVAA/M | <2.00E+01 |
| Potassium | 50705 | 10/19/89 | ICP | 6.88E+02 |
| Potassium | 50752 | 11/02/89 | ICP | 7.42E+02 |
| Potassium | 50756 | 11/03/89 | ICP | 8.49E+02 |
| Potassium | 50984 | 2/27/90 | ICP | 9.23E+02 |
| Selenium (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Selenium (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Selenium (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Selenium (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Silicon | 50705 | 10/19/89 | ICP | 2.20E+03 |
| Silicon | 50752 | 11/02/89 | ICP | 2.44E+03 |
| Silicon | 50756 | 11/03/89 | ICP | 2.41E+03 |
| Silicon | 50984 | 2/27/90 | ICP | 2.23E+03 |
| Silver (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Silver (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Silver (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Silver (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Sodium | 50705 | 10/19/89 | ICP | 2.19E+03 |
| Sodium | 50752 | 11/02/89 | ICP | 2.15E+03 |
| Sodium | 50756 | 11/03/89 | ICP | 2.27E+03 |
| Sodium | 50984 | 2/27/90 | ICP | 1.88E+03 |
| Strontium | 50705 | 10/19/89 | ICP | 9.70E+01 |
| Strontium | 50752 | 11/02/89 | ICP | 9.90E+01 |
| Strontium | 50756 | 11/03/89 | ICP | 1.02E+02 |
| Strontium | 50984 | 2/27/90 | ICP | 8.70E+01 |
| Sulfate | 50705 | 10/19/89 | IC | 1.22E+04 |
| Sulfate | 50752 | 11/02/89 | IC | 1.11E+04 |
| Sulfate | 50756 | 11/03/89 | IC | 1.08E+04 |
| Sulfate | 50984 | 2/27/90 | IC | 1.03E+04 |

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Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 3 of 7)

| Constituent | Sample # | Date | Method | Result |
|-----------------|----------|----------|--------|-----------|
| Uranium | 50705 | 10/19/89 | FLUOR | 5.36E-01 |
| Uranium | 50752 | 11/02/89 | FLUOR | 4.54E-01 |
| Uranium | 50756 | 11/03/89 | FLUOR | 4.23E-01 |
| Zinc | 50705 | 10/19/89 | ICP | 1.30E+01 |
| Zinc | 50752 | 11/02/89 | ICP | 1.00E+01 |
| Zinc | 50756 | 11/03/89 | ICP | 1.60E+01 |
| Zinc | 50984 | 2/27/90 | ICP | 1.20E+01 |
| Acetone | 50705 | 10/19/89 | VOA | 1.50E+01 |
| Acetone | 50705 | 10/19/89 | ABN | <1.00E+01 |
| Acetone | 50705B | 10/19/89 | VOA | 2.10E+01 |
| Acetone | 50705T | 10/19/89 | VOA | 1.40E+01 |
| Acetone | 50752 | 11/02/89 | VOA | <1.00E+01 |
| Acetone | 50752 | 11/02/89 | ABN | <1.00E+01 |
| Acetone | 50752B | 11/02/89 | VOA | <1.00E+01 |
| Acetone | 50752T | 11/02/89 | VOA | <1.00E+01 |
| Acetone | 50756 | 11/03/89 | VOA | <1.00E+01 |
| Acetone | 50756 | 11/03/89 | ABN | <1.00E+01 |
| Acetone | 50756B | 11/03/89 | VOA | <1.00E+01 |
| Acetone | 50756T | 11/03/89 | VOA | <1.00E+01 |
| Acetone | 50984 | 2/27/90 | VOA | <1.00E+01 |
| Acetone | 50984 | 2/27/90 | ABN | <1.00E+01 |
| Acetone | 50984B | 2/27/90 | VOA | <1.00E+01 |
| Acetone | 50984T | 2/27/90 | VOA | <1.00E+01 |
| Ammonia | 50705 | 10/19/89 | ISE | 7.10E+01 |
| Ammonia | 50752 | 11/02/89 | ISE | <5.00E+01 |
| Ammonia | 50756 | 11/03/89 | ISE | <5.00E+01 |
| Ammonia | 50984 | 2/27/90 | ISE | <5.00E+01 |
| Dichloromethane | 50705 | 10/19/89 | VOA | <5.00E+00 |
| Dichloromethane | 50705B | 10/19/89 | VOA | <3.00E+00 |
| Dichloromethane | 50705T | 10/19/89 | VOA | 1.20E+01 |
| Dichloromethane | 50752 | 11/02/89 | VOA | <5.00E+00 |
| Dichloromethane | 50752B | 11/02/89 | VOA | <5.00E+00 |
| Dichloromethane | 50752T | 11/02/89 | VOA | 7.00E+00 |
| Dichloromethane | 50756 | 11/03/89 | VOA | <5.00E+00 |
| Dichloromethane | 50756B | 11/03/89 | VOA | 8.00E+00 |
| Dichloromethane | 50756T | 11/03/89 | VOA | 8.00E+00 |
| Dichloromethane | 50984 | 2/27/90 | VOA | <5.00E+00 |
| Dichloromethane | 50984B | 2/27/90 | VOA | <5.00E+00 |
| Dichloromethane | 50984T | 2/27/90 | VOA | <5.00E+00 |
| Tetrahydrofuran | 50705 | 10/19/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50705B | 10/19/89 | VOA | 1.70E+01 |
| Tetrahydrofuran | 50705T | 10/19/89 | VOA | <6.00E+00 |
| Tetrahydrofuran | 50752 | 11/02/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50752B | 11/02/89 | VOA | 1.40E+01 |
| Tetrahydrofuran | 50752T | 11/02/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50756 | 11/03/89 | VOA | <1.00E+01 |

Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 4 of 7)

| Constituent | Sample # | Date | Method | Result |
|----------------------------|----------|----------|----------|-----------|
| Tetrahydrofuran | 50756B | 11/03/89 | VOA | 1.20E+01 |
| Tetrahydrofuran | 50756T | 11/03/89 | VOA | 1.20E+01 |
| Tetrahydrofuran | 50984 | 2/27/90 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50984B | 2/27/90 | VOA | <6.00E+00 |
| Tetrahydrofuran | 50984T | 2/27/90 | VOA | <6.00E+00 |
| Trichloromethane | 50705 | 10/19/89 | VOA | <3.00E+00 |
| Trichloromethane | 50705B | 10/19/89 | VOA | <5.00E+00 |
| Trichloromethane | 50705T | 10/19/89 | VOA | <5.00E+00 |
| Trichloromethane | 50752 | 11/02/89 | VOA | <5.00E+00 |
| Trichloromethane | 50752B | 11/02/89 | VOA | <5.00E+00 |
| Trichloromethane | 50752T | 11/02/89 | VOA | <3.00E+00 |
| Trichloromethane | 50756 | 11/03/89 | VOA | <3.00E+00 |
| Trichloromethane | 50756B | 11/03/89 | VOA | <3.00E+00 |
| Trichloromethane | 50756T | 11/03/89 | VOA | <3.00E+00 |
| Trichloromethane | 50984 | 2/27/90 | VOA | <5.00E+00 |
| Trichloromethane | 50984B | 2/27/90 | VOA | 1.20E+01 |
| Trichloromethane | 50984T | 2/27/90 | VOA | 8.00E+00 |
| Unknown amide | 50756 | 11/03/89 | ABN | 2.30E+01 |
| Alkalinity (Method B) | 50705 | 10/19/89 | TITRA | 5.40E+04 |
| Alkalinity (Method B) | 50752 | 11/02/89 | TITRA | 5.70E+04 |
| Alkalinity (Method B) | 50756 | 11/03/89 | TITRA | 5.60E+04 |
| Alkalinity (Method B) | 50984 | 2/27/90 | TITRA | 5.70E+04 |
| Alpha Activity (pCi/L) | 50705 | 10/19/89 | Alpha | <2.68E-01 |
| Alpha Activity (pCi/L) | 50752 | 11/02/89 | Alpha | <5.75E-01 |
| Alpha Activity (pCi/L) | 50756 | 11/03/89 | Alpha | 8.22E-01 |
| Beta Activity (pCi/L) | 50705 | 10/19/89 | Beta | 2.97E+00 |
| Beta Activity (pCi/L) | 50752 | 11/02/89 | Beta | <1.48E+00 |
| Beta Activity (pCi/L) | 50756 | 11/03/89 | Beta | <2.09E+00 |
| Conductivity (μS) | 50705 | 10/19/89 | COND-F1d | 1.75E+02 |
| Conductivity (μS) | 50752 | 11/02/89 | COND-F1d | 1.33E+02 |
| Conductivity (μS) | 50756 | 11/03/89 | COND-F1d | 1.53E+02 |
| Conductivity (μS) | 50984 | 2/27/90 | COND-F1d | 1.22E+02 |
| Ignitability (°F) | 50705E | 10/19/89 | IGNIT | 2.08E+02 |
| Ignitability (°F) | 50752E | 11/02/89 | IGNIT | 2.12E+02 |
| Ignitability (°F) | 50756E | 11/03/89 | IGNIT | 2.10E+02 |
| Ignitability (°F) | 50984E | 2/27/90 | IGNIT | 2.06E+02 |
| pH (dimensionless) | 50705 | 10/19/89 | PH-F1d | 7.60E+00 |
| pH (dimensionless) | 50752 | 11/02/89 | PH-F1d | 7.41E+00 |
| pH (dimensionless) | 50756 | 11/03/89 | PH-F1d | 7.70E+00 |
| pH (dimensionless) | 50984 | 2/27/90 | PH-F1d | 7.10E+00 |
| Reactivity Cyanide (mg/kg) | 50705E | 10/19/89 | DSPEC | <1.00E+02 |
| Reactivity Cyanide (mg/kg) | 50752E | 11/02/89 | DSPEC | <1.00E+02 |
| Reactivity Cyanide (mg/kg) | 50756E | 11/03/89 | DSPEC | <1.00E+02 |
| Reactivity Cyanide (mg/kg) | 50984E | 2/27/90 | DSPEC | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50705E | 10/19/89 | DTITRA | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50752E | 11/02/89 | DTITRA | <1.00E+02 |

Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 5 of 7)

| Constituent | Sample # | Date | Method | Result |
|----------------------------|----------|----------|----------|-----------|
| Reactivity Sulfide (mg/kg) | 50756E | 11/03/89 | DTITRA | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50984E | 2/27/90 | DTITRA | <1.00E+02 |
| TDS | 50705 | 10/19/89 | TDS | 5.00E+04 |
| TDS | 50752 | 11/02/89 | TDS | 4.70E+04 |
| TDS | 50756 | 11/03/89 | TDS | 5.20E+04 |
| TDS | 50984 | 2/27/90 | TDS | 5.40E+04 |
| Temperature (°C) | 50705 | 10/19/89 | TEMP-Fld | 2.74E+01 |
| Temperature (°C) | 50752 | 11/02/89 | TEMP-Fld | 1.86E+01 |
| Temperature (°C) | 50756 | 11/03/89 | TEMP-Fld | 2.03E+01 |
| Temperature (°C) | 50984 | 2/27/90 | TEMP-Fld | 1.71E+01 |
| TOC | 50705 | 10/19/89 | TOC | <1.60E+03 |
| TOC | 50752 | 11/02/89 | TOC | <1.20E+03 |
| TOC | 50756 | 11/03/89 | TOC | <1.20E+03 |
| TOC | 50984 | 2/27/90 | TOC | 1.10E+03 |
| Total Carbon | 50705 | 10/19/89 | TC | 1.60E+04 |
| Total Carbon | 50752 | 11/02/89 | TC | 1.42E+04 |
| Total Carbon | 50756 | 11/03/89 | TC | 1.32E+04 |
| Total Carbon | 50984 | 2/27/90 | TC | 1.39E+04 |
| TOX (as Cl) | 50705 | 10/19/89 | LTOX | 4.30E+01 |
| TOX (as Cl) | 50752 | 11/02/89 | LTOX | 4.50E+01 |
| TOX (as Cl) | 50756 | 11/03/89 | LTOX | 5.90E+01 |
| TOX (as Cl) | 50984 | 2/27/90 | LTOX | 2.60E+01 |
| ²⁴² Cm (pCi/L) | 50705 | 10/19/89 | AEA | <3.81E-03 |
| ²⁴² Cm (pCi/L) | 50756 | 11/03/89 | AEA | 5.31E-03 |
| ¹³⁷ Cs (pCi/L) | 50705 | 10/19/89 | GEA | 1.73E+00 |
| ¹³⁷ Cs (pCi/L) | 50752 | 11/02/89 | GEA | 4.95E-01 |
| ¹⁴ C (pCi/L) | 50752 | 11/02/89 | LSC | 4.98E+00 |
| ¹⁴ C (pCi/L) | 50756 | 11/03/89 | LSC | <3.51E+00 |
| ³ H (pCi/L) | 50705 | 10/19/89 | LSC | <1.99E+02 |
| ³ H (pCi/L) | 50752 | 11/02/89 | LSC | <2.90E+01 |
| ³ H (pCi/L) | 50756 | 11/03/89 | LSC | 2.50E+02 |
| ⁹⁰ Sr (pCi/L) | 50705 | 10/19/89 | Beta | 1.24E-01 |
| ⁹⁰ Sr (pCi/L) | 50752 | 11/02/89 | Beta | <9.89E-02 |
| ⁹⁰ Sr (pCi/L) | 50756 | 11/03/89 | Beta | 2.09E-01 |
| ²³⁴ U (pCi/L) | 50705 | 10/19/89 | AEA | 1.89E-01 |
| ²³⁴ U (pCi/L) | 50752 | 11/02/89 | AEA | 1.78E-01 |
| ²³⁴ U (pCi/L) | 50756 | 11/03/89 | AEA | 1.14E-01 |
| ²³⁸ U (pCi/L) | 50705 | 10/19/89 | AEA | 1.43E-01 |
| ²³⁸ U (pCi/L) | 50752 | 11/02/89 | AEA | 1.36E-01 |
| ²³⁸ U (pCi/L) | 50756 | 11/03/89 | AEA | 1.33E-01 |

Sample# is the number of the sample. See chapter three for corresponding chain-of-custody number. Date is the sampling date. Results are in ppb (parts per billion) unless otherwise indicated. The following table lists the methods that are coded in the method column.

Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 6 of 7)

| Code | Analytical Method | Reference |
|----------|---|-----------------|
| ABN | Semivolatile Organics (GC/MS) | USEPA-8270 |
| AEA | ²⁴¹ Am | UST-20Am01 |
| AEA | Curium Isotopes | UST-20Am/Cm01 |
| AEA | Plutonium Isotopes | UST-20Pu01 |
| AEA | Uranium Isotopes | UST-20U01 |
| ALPHA | Alpha Counting | EPA-680/4-75/1 |
| ALPHA-Ra | Total Radium Alpha Counting | ASTM-D2460 |
| BETA | Beta Counting | EPA-680/4-75/1 |
| BETA | ⁹⁰ Sr | UST-20Sr02 |
| COLIF | Coliform Bacteria | USEPA-9131 |
| COLIFMF | Coliform Bacteria (Membrane Filter) | USEPA-9132 |
| COND-Fld | Conductivity-Field | ASTM-D1125A |
| COND-Lab | Conductivity-Laboratory | ASTM-D1125A |
| CVAA | Mercury | USEPA-7470 |
| CVAA/M | Mercury-Mixed Matrix | USEPA-7470 |
| DIGC | Direct Aqueous Injection (GC) | UST-70DIGC |
| DIMS | Direct Aqueous Injection (GC/MS) | "USEPA-8240" |
| DSPEC | Reactive Cyanide (Distillation, Spectroscopy) | USEPA-CHAPTER 7 |
| DTITRA | Reactive Sulfide (Distillation, Titration) | USEPA-CHAPTER 7 |
| FLUOR | Uranium (Fluorometry) | ASTM-D2907-83 |
| GEA | Gamma Energy Analysis Spectroscopy | ASTM-D3649-85 |
| GFAA | Arsenic (AA, Furnace Technique) | USEPA-7060 |
| GFAA | Lead (AA, Furnace Technique) | USEPA-7421 |
| GFAA | Selenium (AA, Furnace Technique) | USEPA-7740 |
| GFAA | Thallium (AA, Furnace Technique) | USEPA-7841 |
| IC | Ion Chromatography | EPA-600/4-84-01 |
| ICP | Atomic Emission Spectroscopy (ICP) | USEPA-6010 |
| ICP/M | Atomic Emission Spectroscopy (ICP)-Mixed Matrix | USEPA-6010 |
| IGNIT | Pensky-Martens Closed-Cup Ignitability | USEPA-1010 |
| ISE | Fluoride-Low Detection Limit | ASTM-D1179-80-B |
| ISE | Ammonium Ion | ASTM-D1426-D |
| LALPHA | Alpha Activity-Low Detection Limit | EPA-680/4-75/1 |
| LEPD | ¹²⁹ I | UST-20I02 |
| LSC | ¹⁴ C | UST-20C01 |
| LSC | Tritium | UST-20H03 |
| LTOX | Total Organic Halides-Low Detection Limit | USEPA-9020 |
| PH-Fld | pH-Field | USEPA-9040 |
| PH-Lab | pH-Laboratory | USEPA-9040 |
| SPEC | Total and Amenable Cyanide (Spectroscopy) | USEPA-9010 |
| SPEC | Hydrazine-Low Detection Limit (Spectroscopy) | ASTM-D1385 |
| SSOLID | Suspended Solids | SM-208D |
| TC | Total Carbon | USEPA-9060 |
| TDS | Total Dissolved Solids | SM-208B |
| TEMP-Fld | Temperature-Field | Local |

Table B-1. New Data for the Period October 1989 through March 1990.
(sheet 7 of 7)

| Code | Analytical Method | Reference |
|-------|---------------------------------|-------------|
| TITRA | Alkalinity-Method B (Titration) | ASTM-D1067B |
| TITRA | Sulfides (Titration) | USEPA-9030 |
| TOC | Total Organic Carbon | USEPA-9060 |
| TOX | Total Organic Halides | USEPA-9020 |
| VOA | Volatile Organics (GC/MS) | USEPA-8240 |

Analytical Method Acronyms:

atomic absorption spectroscopy (AA)
gas chromatography (GC)
mass spectrometry (MS)
inductively-coupled plasma spectroscopy (ICP).

References:

ASTM - "1986 Annual Book of ASTM Standards", American Society for Testing and Materials, Philadelphia, Pennsylvania.

EPA - Various methods of the U.S. Environmental Protection Agency, Washington, D.C.

UST - Methods of the contract laboratory.

SM - "Standard Methods for the Examination of Water and Wastewater," 16th ed., American Public Health Association, American Water Works Association and Water Pollution Control Federation, Washington, D.C.

USEPA - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd ed., SW-846, U.S. Environmental Protection Agency, Washington, D.C.

Table B-2. Total Data. (sheet 1 of 20)

| Constituent | Sample # | Date | Method | Result |
|---|----------|----------|--------|-----------|
| B Plant Chemical Sewage -- Anion Exchange Regenerate | | | | |
| Aluminum | 50029 | 4/09/86 | ICP | 4.99E+02 |
| Aluminum | 50101 | 7/31/86 | ICP | <3.12E+03 |
| Aluminum | 50281 | 4/13/87 | ICP | 4.03E+02 |
| Aluminum | 50328 | 7/23/87 | ICP | 1.07E+03 |
| Aluminum | 50370 | 12/29/87 | ICP | 1.95E+03 |
| Antimony | 50029 | 4/09/86 | ICP | <1.00E+02 |
| Antimony | 50101 | 7/31/86 | ICP | 2.28E+02 |
| Antimony | 50281 | 4/13/87 | ICP | <1.00E+02 |
| Antimony | 50328 | 7/23/87 | ICP | <1.00E+02 |
| Antimony | 50370 | 12/29/87 | ICP | <1.00E+02 |
| Barium | 50029 | 4/09/86 | ICP | 1.15E+02 |
| Barium | 50101 | 7/31/86 | ICP | 5.80E+01 |
| Barium | 50281 | 4/13/87 | ICP | 8.80E+01 |
| Barium | 50328 | 7/23/87 | ICP | 6.80E+01 |
| Barium | 50370 | 12/29/87 | ICP | 1.45E+02 |
| Cadmium | 50029 | 4/09/86 | ICP | <2.00E+00 |
| Cadmium | 50281 | 4/13/87 | ICP | <2.00E+00 |
| Cadmium | 50328 | 7/23/87 | ICP | <2.00E+00 |
| Cadmium | 50370 | 12/29/87 | ICP | 8.00E+00 |
| Calcium | 50029 | 4/09/86 | ICP | 1.72E+05 |
| Calcium | 50101 | 7/31/86 | ICP | 2.17E+04 |
| Calcium | 50281 | 4/13/87 | ICP | 7.22E+04 |
| Calcium | 50328 | 7/23/87 | ICP | 4.51E+04 |
| Calcium | 50370 | 12/29/87 | ICP | 1.35E+05 |
| Chloride | 50029 | 4/09/86 | IC | 1.36E+03 |
| Chloride | 50101 | 7/31/86 | IC | 1.44E+05 |
| Chloride | 50281 | 4/13/87 | IC | <3.10E+05 |
| Chloride | 50328 | 7/23/87 | IC | 9.50E+04 |
| Chloride | 50370 | 12/29/87 | IC | 1.36E+05 |
| Chromium | 50029 | 4/09/86 | ICP | <1.00E+01 |
| Chromium | 50101 | 7/31/86 | ICP | 3.80E+02 |
| Chromium | 50281 | 4/13/87 | ICP | 5.00E+01 |
| Chromium | 50328 | 7/23/87 | ICP | 1.06E+02 |
| Chromium | 50370 | 12/29/87 | ICP | 2.65E+02 |
| Copper | 50029 | 4/09/86 | ICP | 8.90E+01 |
| Copper | 50101 | 7/31/86 | ICP | 2.49E+02 |
| Copper | 50281 | 4/13/87 | ICP | 9.80E+01 |
| Copper | 50328 | 7/23/87 | ICP | 2.33E+02 |
| Copper | 50370 | 12/29/87 | ICP | 6.19E+02 |
| Fluoride | 50029 | 4/09/86 | IC | 2.84E+03 |
| Fluoride | 50101 | 7/31/86 | IC | <2.50E+04 |
| Fluoride | 50281 | 4/13/87 | IC | <5.00E+05 |
| Fluoride | 50328 | 7/23/87 | IC | 1.02E+04 |
| Fluoride | 50328 | 7/23/87 | ISE | 2.60E+03 |

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Table B-2. Total Data. (sheet 2 of 20)

| Constituent | Sample # | Date | Method | Result |
|-------------|----------|----------|--------|-----------|
| Fluoride | 50370 | 12/29/87 | IC | 2.85E+04 |
| Fluoride | 50370 | 12/29/87 | ISE | 2.38E+03 |
| Iron | 50029 | 4/09/86 | ICP | 1.67E+03 |
| Iron | 50101 | 7/31/86 | ICP | 1.39E+04 |
| Iron | 50281 | 4/13/87 | ICP | 2.01E+03 |
| Iron | 50328 | 7/23/87 | ICP | 3.14E+03 |
| Iron | 50370 | 12/29/87 | ICP | 7.23E+03 |
| Lead | 50281 | 4/13/87 | GFAA | 2.00E+01 |
| Lead | 50328 | 7/23/87 | GFAA | 1.40E+01 |
| Lead | 50370 | 12/29/87 | GFAA | 8.10E+01 |
| Magnesium | 50029 | 4/09/86 | ICP | 4.84E+04 |
| Magnesium | 50101 | 7/31/86 | ICP | 4.44E+03 |
| Magnesium | 50281 | 4/13/87 | ICP | 6.93E+03 |
| Magnesium | 50328 | 7/23/87 | ICP | 7.58E+03 |
| Magnesium | 50370 | 12/29/87 | ICP | 6.74E+03 |
| Manganese | 50029 | 4/09/86 | ICP | 4.40E+01 |
| Manganese | 50101 | 7/31/86 | ICP | 2.84E+02 |
| Manganese | 50281 | 4/13/87 | ICP | 3.70E+01 |
| Manganese | 50328 | 7/23/87 | ICP | 9.80E+01 |
| Manganese | 50370 | 12/29/87 | ICP | 1.47E+02 |
| Mercury | 50029 | 4/09/86 | CVAA | 1.33E+00 |
| Mercury | 50101 | 7/31/86 | CVAA | 2.00E+00 |
| Mercury | 50281 | 4/13/87 | CVAA | 3.60E-01 |
| Mercury | 50328 | 7/23/87 | CVAA | 6.80E-01 |
| Mercury | 50370 | 12/29/87 | CVAA | 5.40E-01 |
| Nickel | 50029 | 4/09/86 | ICP | <1.00E+01 |
| Nickel | 50101 | 7/31/86 | ICP | 3.60E+01 |
| Nickel | 50281 | 4/13/87 | ICP | <1.00E+01 |
| Nickel | 50328 | 7/23/87 | ICP | 1.00E+01 |
| Nickel | 50370 | 12/29/87 | ICP | 2.80E+01 |
| Nitrate | 50029 | 4/09/86 | IC | <5.00E+02 |
| Nitrate | 50101 | 7/31/86 | IC | <2.50E+04 |
| Nitrate | 50281 | 4/13/87 | IC | <2.20E+04 |
| Nitrate | 50328 | 7/23/87 | IC | 5.26E+03 |
| Phosphate | 50029 | 4/09/86 | IC | <1.00E+03 |
| Phosphate | 50101 | 7/31/86 | IC | 1.71E+07 |
| Phosphate | 50281 | 4/13/87 | IC | 8.04E+06 |
| Phosphate | 50328 | 7/23/87 | IC | 4.50E+06 |
| Phosphate | 50370 | 12/29/87 | IC | 1.46E+07 |
| Potassium | 50029 | 4/09/86 | ICP | 6.57E+03 |
| Potassium | 50101 | 7/31/86 | ICP | 6.84E+03 |
| Potassium | 50281 | 4/13/87 | ICP | 1.52E+03 |
| Potassium | 50328 | 7/23/87 | ICP | 2.19E+03 |
| Potassium | 50370 | 12/29/87 | ICP | 3.95E+03 |
| Sodium | 50029 | 4/09/86 | ICP | 4.13E+05 |

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Table B-2. Total Data. (sheet 3 of 20)

| Constituent | Sample # | Date | Method | Result |
|-----------------------------|----------|----------|--------|-----------|
| Sodium | 50101 | 7/31/86 | ICP | 9.13E+06 |
| Sodium | 50281 | 4/13/87 | ICP | 1.64E+06 |
| Sodium | 50328 | 7/23/87 | ICP | 3.47E+06 |
| Sodium | 50370 | 12/29/87 | ICP | 5.40E+06 |
| Strontium | 50029 | 4/09/86 | ICP | 6.69E+02 |
| Strontium | 50101 | 7/31/86 | ICP | <3.00E+02 |
| Strontium | 50281 | 4/13/87 | ICP | 3.15E+02 |
| Strontium | 50328 | 7/23/87 | ICP | <3.00E+02 |
| Strontium | 50370 | 12/29/87 | ICP | 4.35E+02 |
| Sulfate | 50029 | 4/09/86 | IC | 2.90E+06 |
| Sulfate | 50101 | 7/31/86 | IC | 5.34E+05 |
| Sulfate | 50281 | 4/13/87 | IC | <4.93E+05 |
| Sulfate | 50328 | 7/23/87 | IC | 4.35E+05 |
| Sulfate | 50370 | 12/29/87 | IC | 5.40E+05 |
| Uranium | 50029 | 4/09/86 | FLUOR | 4.63E+00 |
| Uranium | 50101 | 7/31/86 | FLUOR | 3.62E+00 |
| Uranium | 50281 | 4/13/87 | FLUOR | 7.37E-01 |
| Uranium | 50328 | 7/23/87 | FLUOR | 9.33E-01 |
| Uranium | 50370 | 12/29/87 | FLUOR | 4.50E-01 |
| Vanadium | 50029 | 4/09/86 | ICP | <5.00E+00 |
| Vanadium | 50101 | 7/31/86 | ICP | 7.00E+00 |
| Vanadium | 50281 | 4/13/87 | ICP | <5.00E+00 |
| Vanadium | 50328 | 7/23/87 | ICP | <5.00E+00 |
| Vanadium | 50370 | 12/29/87 | ICP | 7.00E+00 |
| Zinc | 50029 | 4/09/86 | ICP | 4.24E+02 |
| Zinc | 50101 | 7/31/86 | ICP | 4.40E+02 |
| Zinc | 50281 | 4/13/87 | ICP | 2.42E+02 |
| Zinc | 50328 | 7/23/87 | ICP | 5.97E+02 |
| Zinc | 50370 | 12/29/87 | ICP | 7.85E+02 |
| Acetone | 50101 | 7/31/86 | VOA | 4.70E+01 |
| Acetone | 50370 | 12/29/87 | VOA | 1.10E+01 |
| Ammonia | 50029 | 4/09/86 | ISE | <5.00E+01 |
| Ammonia | 50101 | 7/31/86 | ISE | 1.75E+02 |
| Ammonia | 50281 | 4/13/87 | ISE | 9.60E+01 |
| Ammonia | 50328 | 7/23/87 | ISE | 6.40E+01 |
| Ammonia | 50370 | 12/29/87 | ISE | 7.20E+01 |
| Bis(2-ethylhexyl) phthalate | 50029 | 4/09/86 | ABN | <1.00E+01 |
| Bis(2-ethylhexyl) phthalate | 50101 | 7/31/86 | ABN | <1.00E+01 |
| Bis(2-ethylhexyl) phthalate | 50281 | 4/13/87 | ABN | <1.00E+01 |
| Bis(2-ethylhexyl) phthalate | 50328 | 7/23/87 | ABN | <1.00E+01 |
| Bis(2-ethylhexyl) phthalate | 50370 | 12/29/87 | ABN | 1.00E+01 |
| Dichloromethane | 50029 | 4/09/86 | VOA | <1.00E+01 |
| Dichloromethane | 50101 | 7/31/86 | VOA | <1.00E+01 |
| Dichloromethane | 50101B | 7/31/86 | VOA | 1.50E+02 |
| Dichloromethane | 50281 | 4/13/87 | VOA | <1.00E+01 |

Table B-2. Total Data. (sheet 4 of 20)

| Constituent | Sample # | Date | Method | Result |
|------------------------|----------|----------|----------|-----------|
| Dichloromethane | 50281B | 4/13/87 | VOA | 3.80E+01 |
| Dichloromethane | 50328 | 7/23/87 | VOA | <1.00E+01 |
| Dichloromethane | 50328B | 7/23/87 | VOA | 1.34E+01 |
| Dichloromethane | 50370 | 12/29/87 | VOA | <1.00E+01 |
| Dichloromethane | 50370B | 12/29/87 | VOA | <1.00E+01 |
| Hexadecanoic acid | 50281 | 4/13/87 | ABN | 2.00E+01 |
| Octacosane | 50281 | 4/13/87 | ABN | 1.10E+02 |
| 1,1,1-Trichloromethane | 50029 | 4/09/86 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50101 | 7/31/86 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50101B | 7/31/86 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50281 | 4/13/87 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50281B | 4/13/87 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50328 | 7/23/87 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50328B | 7/23/87 | VOA | <1.00E+01 |
| 1,1,1-Trichloromethane | 50370 | 12/29/87 | VOA | <5.00E+00 |
| 1,1,1-Trichloromethane | 50370B | 12/29/87 | VOA | 6.00E+00 |
| Trichloromethane | 50029 | 4/09/86 | VOA | <1.00E+01 |
| Trichloromethane | 50101 | 7/31/86 | VOA | 1.40E+01 |
| Trichloromethane | 50101B | 7/31/86 | VOA | <1.00E+01 |
| Trichloromethane | 50281 | 4/13/87 | VOA | 1.40E+01 |
| Trichloromethane | 50281B | 4/13/87 | VOA | <1.00E+01 |
| Trichloromethane | 50328 | 7/23/87 | VOA | <6.60E+00 |
| Trichloromethane | 50328B | 7/23/87 | VOA | <1.00E+01 |
| Trichloromethane | 50370 | 12/29/87 | VOA | 1.30E+01 |
| Trichloromethane | 50370B | 12/29/87 | VOA | 1.70E+01 |
| Unknown | 50101 | 7/31/86 | ABN | 4.00E+01 |
| Unknown | 50281 | 4/13/87 | ABN | 1.20E+01 |
| Unknown aliphatic HC | 50029 | 4/09/86 | ABN | 1.30E+01 |
| Alpha Activity (pCi/L) | 50029 | 4/09/86 | Alpha | 3.14E+00 |
| Alpha Activity (pCi/L) | 50101 | 7/31/86 | Alpha | 3.75E+01 |
| Alpha Activity (pCi/L) | 50328 | 7/23/87 | Alpha | 5.28E+00 |
| Beta Activity (pCi/L) | 50029 | 4/09/86 | Beta | 5.05E+01 |
| Beta Activity (pCi/L) | 50101 | 7/31/86 | Beta | 1.35E+02 |
| Beta Activity (pCi/L) | 50281 | 4/13/87 | Beta | 3.90E+01 |
| Beta Activity (pCi/L) | 50328 | 7/23/87 | Beta | 3.41E+01 |
| Beta Activity (pCi/L) | 50370 | 12/29/87 | Beta | 2.12E+01 |
| Conductivity (μS) | 50101 | 7/31/86 | COND-F1d | 1.60E+04 |
| Conductivity (μS) | 50281 | 4/13/87 | COND-F1d | 5.04E+03 |
| Conductivity (μS) | 50328 | 7/23/87 | COND-F1d | 5.04E+03 |
| Conductivity (μS) | 50370 | 12/29/87 | COND-F1d | 8.79E+03 |
| pH (dimensionless) | 50029 | 4/09/86 | PH-F1d | 2.28E+00 |
| pH (dimensionless) | 50101 | 7/31/86 | PH-F1d | 7.22E+00 |
| pH (dimensionless) | 50281 | 4/13/87 | PH-F1d | 7.03E+00 |
| pH (dimensionless) | 50328 | 7/23/87 | PH-F1d | 7.72E+00 |
| pH (dimensionless) | 50370 | 12/29/87 | PH-F1d | 7.02E+00 |

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Table B-2. Total Data. (sheet 5 of 20)

| Constituent | Sample # | Date | Method | Result |
|--|----------|----------|----------|-----------|
| Temperature (°C) | 50029 | 4/09/86 | TEMP-Fld | 1.50E+01 |
| Temperature (°C) | 50101 | 7/31/86 | TEMP-Fld | 3.03E+01 |
| Temperature (°C) | 50281 | 4/13/87 | TEMP-Fld | 1.57E+01 |
| Temperature (°C) | 50328 | 7/23/87 | TEMP-Fld | 2.71E+01 |
| Temperature (°C) | 50370 | 12/29/87 | TEMP-Fld | 1.90E+01 |
| TOC | 50101 | 7/31/86 | TOC | 2.54E+04 |
| TOC | 50281 | 4/13/87 | TOC | 1.66E+04 |
| TOC | 50328 | 7/23/87 | TOC | 1.45E+04 |
| TOC | 50370 | 12/29/87 | TOC | 3.18E+04 |
| TOX (as Cl) | 50029 | 4/09/86 | TOX | <6.28E+01 |
| TOX (as Cl) | 50101 | 7/31/86 | TOX | 2.23E+02 |
| TOX (as Cl) | 50281 | 4/13/87 | LTOX | 1.29E+02 |
| TOX (as Cl) | 50328 | 7/23/87 | LTOX | 1.36E+02 |
| TOX (as Cl) | 50370 | 12/29/87 | LTOX | 1.32E+02 |
| B Plant Chemical Sewage -- Cation Exchange Regenerate | | | | |
| Aluminum | 50016 | 9/12/85 | ICP | <1.50E+02 |
| Aluminum | 50030 | 4/15/86 | ICP | 1.63E+02 |
| Aluminum | 50103 | 8/01/86 | ICP | 5.06E+02 |
| Aluminum | 50218 | 1/09/87 | ICP | 1.62E+02 |
| Aluminum | 50279 | 4/10/87 | ICP | 3.14E+02 |
| Aluminum | 50326 | 7/21/87 | ICP | 8.03E+02 |
| Aluminum | 50350 | 10/02/87 | ICP | 9.43E+02 |
| Barium | 50016 | 9/12/85 | ICP | 2.80E+01 |
| Barium | 50030 | 4/15/86 | ICP | 2.30E+01 |
| Barium | 50103 | 8/01/86 | ICP | 8.20E+01 |
| Barium | 50218 | 1/09/87 | ICP | 2.90E+01 |
| Barium | 50279 | 4/10/87 | ICP | 2.80E+01 |
| Barium | 50326 | 7/21/87 | ICP | 7.00E+01 |
| Barium | 50350 | 10/02/87 | ICP | 5.70E+01 |
| Cadmium | 50016 | 9/12/85 | ICP | 2.00E+00 |
| Cadmium | 50030 | 4/15/86 | ICP | <2.00E+00 |
| Cadmium | 50103 | 8/01/86 | ICP | 2.00E+00 |
| Cadmium | 50218 | 1/09/87 | ICP | <2.00E+00 |
| Cadmium | 50279 | 4/10/87 | ICP | <2.00E+00 |
| Cadmium | 50326 | 7/21/87 | ICP | 3.00E+00 |
| Cadmium | 50350 | 10/02/87 | ICP | <2.00E+00 |
| Calcium | 50016 | 9/12/85 | ICP | 1.68E+04 |
| Calcium | 50030 | 4/15/86 | ICP | 1.79E+04 |
| Calcium | 50103 | 8/01/86 | ICP | 1.25E+05 |
| Calcium | 50218 | 1/09/87 | ICP | 2.29E+04 |
| Calcium | 50279 | 4/10/87 | ICP | 3.64E+04 |
| Calcium | 50326 | 7/21/87 | ICP | 4.03E+04 |
| Calcium | 50350 | 10/02/87 | ICP | 3.65E+04 |
| Chloride | 50016 | 9/12/85 | IC | 1.11E+03 |
| Chloride | 50030 | 4/15/86 | IC | 1.37E+04 |
| Chloride | 50103 | 8/01/86 | IC | <2.50E+04 |

Table B-2. Total Data. (sheet 6 of 20)

| Constituent | Sample # | Date | Method | Result |
|-------------|----------|----------|--------|-----------|
| Chloride | 50218 | 1/09/87 | IC | 3.89E+03 |
| Chloride | 50279 | 4/10/87 | IC | <3.12E+04 |
| Chloride | 50326 | 7/21/87 | IC | 1.16E+04 |
| Chloride | 50350 | 10/02/87 | IC | 6.59E+03 |
| Copper | 50016 | 9/12/85 | ICP | 1.00E+01 |
| Copper | 50030 | 4/15/86 | ICP | 1.50E+01 |
| Copper | 50103 | 8/01/86 | ICP | 4.80E+01 |
| Copper | 50218 | 1/09/87 | ICP | 3.10E+01 |
| Copper | 50279 | 4/10/87 | ICP | 3.50E+01 |
| Copper | 50326 | 7/21/87 | ICP | 6.70E+01 |
| Copper | 50350 | 10/02/87 | ICP | 9.30E+01 |
| Cyanide | 50016 | 9/12/85 | SPEC | 1.69E+01 |
| Cyanide | 50030 | 4/15/86 | SPEC | <1.00E+01 |
| Cyanide | 50103 | 8/01/86 | SPEC | 1.00E+01 |
| Cyanide | 50218 | 1/09/87 | SPEC | <1.00E+01 |
| Cyanide | 50279 | 4/10/87 | SPEC | <1.00E+01 |
| Cyanide | 50326 | 7/21/87 | SPEC | <1.00E+01 |
| Cyanide | 50350 | 10/02/87 | SPEC | <1.00E+01 |
| Fluoride | 50016 | 9/12/85 | IC | 1.51E+03 |
| Fluoride | 50030 | 4/15/86 | IC | 7.45E+03 |
| Fluoride | 50103 | 8/01/86 | IC | <2.50E+04 |
| Fluoride | 50218 | 1/09/87 | IC | 8.34E+03 |
| Fluoride | 50279 | 4/10/87 | IC | <5.00E+04 |
| Fluoride | 50326 | 7/21/87 | IC | 1.35E+04 |
| Fluoride | 50350 | 10/02/87 | IC | 4.49E+03 |
| Fluoride | 50350 | 10/02/87 | ISE | 1.75E+02 |
| Iron | 50016 | 9/12/85 | ICP | 1.64E+02 |
| Iron | 50030 | 4/15/86 | ICP | 2.32E+02 |
| Iron | 50103 | 8/01/86 | ICP | 1.40E+03 |
| Iron | 50218 | 1/09/87 | ICP | 4.10E+02 |
| Iron | 50279 | 4/10/87 | ICP | 7.80E+02 |
| Iron | 50326 | 7/21/87 | ICP | 1.83E+03 |
| Iron | 50350 | 10/02/87 | ICP | 2.54E+03 |
| Lead | 50016 | 9/12/85 | ICP | <3.00E+01 |
| Lead | 50218 | 1/09/87 | GFAA | 5.30E+00 |
| Lead | 50279 | 4/10/87 | GFAA | 9.00E+00 |
| Lead | 50326 | 7/21/87 | GFAA | 1.20E+01 |
| Lead | 50350 | 10/02/87 | GFAA | 2.60E+01 |
| Magnesium | 50016 | 9/12/85 | ICP | 3.58E+03 |
| Magnesium | 50030 | 4/15/86 | ICP | 4.16E+03 |
| Magnesium | 50103 | 8/01/86 | ICP | 5.39E+04 |
| Magnesium | 50218 | 1/09/87 | ICP | 4.93E+04 |
| Magnesium | 50279 | 4/10/87 | ICP | 3.24E+04 |
| Magnesium | 50326 | 7/21/87 | ICP | 3.67E+04 |
| Magnesium | 50350 | 10/02/87 | ICP | 3.54E+04 |

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Table B-2. Total Data. (sheet 7 of 20)

| Constituent | Sample # | Date | Method | Result |
|-------------|----------|----------|--------|-----------|
| Manganese | 50016 | 9/12/85 | ICP | 1.40E+01 |
| Manganese | 50030 | 4/15/86 | ICP | 8.00E+00 |
| Manganese | 50103 | 8/01/86 | ICP | 5.50E+01 |
| Manganese | 50218 | 1/09/87 | ICP | 7.00E+00 |
| Manganese | 50279 | 4/10/87 | ICP | 1.60E+01 |
| Manganese | 50326 | 7/21/87 | ICP | 7.60E+01 |
| Manganese | 50350 | 10/02/87 | ICP | 1.54E+02 |
| Mercury | 50016 | 9/12/85 | CVAA | <1.00E-01 |
| Mercury | 50030 | 4/15/86 | CVAA | <1.00E-01 |
| Mercury | 50103 | 8/01/86 | CVAA | 2.60E+00 |
| Mercury | 50218 | 1/09/87 | CVAA | 7.00E-01 |
| Mercury | 50279 | 4/10/87 | CVAA | 2.40E+00 |
| Mercury | 50326 | 7/21/87 | CVAA | 5.00E+00 |
| Mercury | 50350 | 10/02/87 | CVAA | 5.40E+00 |
| Nickel | 50016 | 9/12/85 | ICP | <1.00E+01 |
| Nickel | 50030 | 4/15/86 | ICP | 1.10E+01 |
| Nickel | 50103 | 8/01/86 | ICP | <1.00E+01 |
| Nickel | 50218 | 1/09/87 | ICP | <1.00E+01 |
| Nickel | 50279 | 4/10/87 | ICP | <1.00E+01 |
| Nickel | 50326 | 7/21/87 | ICP | <1.00E+01 |
| Nickel | 50350 | 10/02/87 | ICP | <1.00E+01 |
| Nitrate | 50016 | 9/12/85 | IC | 5.30E+02 |
| Nitrate | 50030 | 4/15/86 | IC | 1.93E+03 |
| Nitrate | 50103 | 8/01/86 | IC | <2.50E+04 |
| Nitrate | 50218 | 1/09/87 | IC | <2.50E+03 |
| Nitrate | 50279 | 4/10/87 | IC | <5.00E+04 |
| Nitrate | 50326 | 7/21/87 | IC | <4.16E+03 |
| Nitrate | 50350 | 10/02/87 | IC | <2.50E+03 |
| Phosphate | 50016 | 9/12/85 | IC | <1.00E+03 |
| Phosphate | 50030 | 4/15/86 | IC | <1.00E+03 |
| Phosphate | 50103 | 8/01/86 | IC | <5.00E+04 |
| Phosphate | 50218 | 1/09/87 | IC | <5.00E+03 |
| Phosphate | 50279 | 4/10/87 | IC | <1.00E+05 |
| Phosphate | 50326 | 7/21/87 | IC | <1.00E+03 |
| Phosphate | 50350 | 10/02/87 | IC | 5.85E+03 |
| Potassium | 50016 | 9/12/85 | ICP | 1.22E+03 |
| Potassium | 50030 | 4/15/86 | ICP | 9.61E+02 |
| Potassium | 50103 | 8/01/86 | ICP | 1.48E+04 |
| Potassium | 50218 | 1/09/87 | ICP | 1.11E+04 |
| Potassium | 50279 | 4/10/87 | ICP | 9.25E+03 |
| Potassium | 50326 | 7/21/87 | ICP | 1.29E+04 |
| Potassium | 50350 | 10/02/87 | ICP | 8.05E+03 |
| Sodium | 50016 | 9/12/85 | ICP | 1.53E+05 |
| Sodium | 50030 | 4/15/86 | ICP | 6.48E+05 |
| Sodium | 50103 | 8/01/86 | ICP | 4.66E+06 |

Table B-2. Total Data. (sheet 8 of 20)

| Constituent | Sample # | Date | Method | Result |
|-------------|----------|----------|--------|-----------|
| Sodium | 50218 | 1/09/87 | ICP | 3.47E+06 |
| Sodium | 50279 | 4/10/87 | ICP | 5.87E+06 |
| Sodium | 50326 | 7/21/87 | ICP | 3.56E+06 |
| Sodium | 50350 | 10/02/87 | ICP | 3.86E+06 |
| Strontium | 50016 | 9/12/85 | ICP | <3.00E+02 |
| Strontium | 50030 | 4/15/86 | ICP | <3.00E+02 |
| Strontium | 50103 | 8/01/86 | ICP | 4.55E+02 |
| Strontium | 50218 | 1/09/87 | ICP | <3.00E+02 |
| Strontium | 50279 | 4/10/87 | ICP | <3.00E+02 |
| Strontium | 50326 | 7/21/87 | ICP | <3.00E+02 |
| Strontium | 50350 | 10/02/87 | ICP | <3.00E+02 |
| Sulfate | 50016 | 9/12/85 | IC | 1.03E+04 |
| Sulfate | 50030 | 4/15/86 | IC | 1.33E+05 |
| Sulfate | 50103 | 8/01/86 | IC | 5.04E+06 |
| Sulfate | 50218 | 1/09/87 | IC | 4.08E+06 |
| Sulfate | 50279 | 4/10/87 | IC | <4.15E+06 |
| Sulfate | 50326 | 7/21/87 | IC | 4.23E+06 |
| Sulfate | 50350 | 10/02/87 | IC | 2.80E+06 |
| Sulfide | 50016 | 9/12/85 | TITRA | <1.00E+03 |
| Sulfide | 50030 | 4/15/86 | TITRA | <1.00E+03 |
| Sulfide | 50103 | 8/01/86 | TITRA | 1.19E+03 |
| Sulfide | 50218 | 1/09/87 | TITRA | <1.00E+03 |
| Sulfide | 50279 | 4/10/87 | TITRA | <1.00E+03 |
| Sulfide | 50326 | 7/21/87 | TITRA | <1.00E+03 |
| Sulfide | 50350 | 10/02/87 | TITRA | 5.54E+04 |
| Uranium | 50016 | 9/12/85 | FLUOR | 5.05E-01 |
| Uranium | 50030 | 4/15/86 | FLUOR | 3.53E+00 |
| Uranium | 50103 | 8/01/86 | FLUOR | 2.74E+00 |
| Uranium | 50218 | 1/09/87 | FLUOR | 7.27E+00 |
| Uranium | 50279 | 4/10/87 | FLUOR | 3.33E+00 |
| Uranium | 50326 | 7/21/87 | FLUOR | 2.31E-01 |
| Uranium | 50350 | 10/02/87 | FLUOR | 4.39E+00 |
| Vanadium | 50016 | 9/12/85 | ICP | <5.00E+00 |
| Vanadium | 50030 | 4/15/86 | ICP | <5.00E+00 |
| Vanadium | 50103 | 8/01/86 | ICP | 8.00E+00 |
| Vanadium | 50218 | 1/09/87 | ICP | 6.00E+00 |
| Vanadium | 50279 | 4/10/87 | ICP | 7.00E+00 |
| Vanadium | 50326 | 7/21/87 | ICP | 6.00E+00 |
| Vanadium | 50350 | 10/02/87 | ICP | 1.00E+01 |
| Zinc | 50016 | 9/12/85 | ICP | 1.20E+01 |
| Zinc | 50030 | 4/15/86 | ICP | 6.70E+01 |
| Zinc | 50103 | 8/01/86 | ICP | 1.20E+02 |
| Zinc | 50218 | 1/09/87 | ICP | 2.10E+01 |
| Zinc | 50279 | 4/10/87 | ICP | 3.50E+01 |
| Zinc | 50326 | 7/21/87 | ICP | 8.60E+01 |
| Zinc | 50350 | 10/02/87 | ICP | 1.34E+02 |

Table B-2. Total Data. (sheet 9 of 20)

| Constituent | Sample # | Date | Method | Result |
|------------------------|----------|----------|--------|-----------|
| Acetone | 50030 | 4/15/86 | VOA | 2.90E+01 |
| Ammonia | 50016 | 9/12/85 | ISE | <5.00E+01 |
| Ammonia | 50030 | 4/15/86 | ISE | <5.00E+01 |
| Ammonia | 50103 | 8/01/86 | ISE | 9.80E+01 |
| Ammonia | 50218 | 1/09/87 | ISE | 6.90E+01 |
| Ammonia | 50279 | 4/10/87 | ISE | 1.00E+02 |
| Ammonia | 50326 | 7/21/87 | ISE | <5.00E+01 |
| Ammonia | 50350 | 10/02/87 | ISE | 6.80E+01 |
| 1-Butanol | 50016 | 9/12/85 | VOA | 1.20E+01 |
| Dichloromethane | 50016 | 9/12/85 | VOA | <1.00E+01 |
| Dichloromethane | 50030 | 4/15/86 | VOA | <1.00E+01 |
| Dichloromethane | 50103 | 8/01/86 | VOA | <1.00E+01 |
| Dichloromethane | 50103B | 8/01/86 | VOA | 1.40E+02 |
| Dichloromethane | 50218 | 1/09/87 | VOA | <1.00E+01 |
| Dichloromethane | 50218B | 1/09/87 | VOA | 6.80E+01 |
| Dichloromethane | 50279 | 4/10/87 | VOA | <1.00E+01 |
| Dichloromethane | 50279B | 4/10/87 | VOA | 4.00E+01 |
| Dichloromethane | 50350 | 10/02/87 | VOA | <1.00E+01 |
| Dichloromethane | 50350B | 10/02/87 | VOA | <1.00E+01 |
| Trichloromethane | 50016 | 9/12/85 | VOA | <1.00E+01 |
| Trichloromethane | 50030 | 4/15/86 | VOA | 1.02E+01 |
| Trichloromethane | 50103 | 8/01/86 | VOA | 1.10E+01 |
| Trichloromethane | 50103B | 8/01/86 | VOA | <1.00E+01 |
| Trichloromethane | 50218 | 1/09/87 | VOA | <1.00E+01 |
| Trichloromethane | 50218B | 1/09/87 | VOA | <1.00E+01 |
| Trichloromethane | 50279 | 4/10/87 | VOA | <1.00E+01 |
| Trichloromethane | 50279B | 4/10/87 | VOA | <1.00E+01 |
| Trichloromethane | 50350 | 10/02/87 | VOA | 1.80E+01 |
| Trichloromethane | 50350B | 10/02/87 | VOA | 2.40E+01 |
| Unknown | 50103 | 8/01/86 | ABN | 2.50E+01 |
| Unknown | 50218 | 1/09/87 | ABN | 8.00E+01 |
| Unknown | 50350 | 10/02/87 | ABN | 1.60E+01 |
| Unknown aliphatic HC | 50030 | 4/15/86 | ABN | 2.10E+02 |
| Unknown aliphatic HC | 50279 | 4/10/87 | ABN | 5.30E+01 |
| Unknown aliphatic HC | 50326 | 7/21/87 | ABN | 3.10E+01 |
| Unknown aliphatic HC | 50350 | 10/02/87 | ABN | 2.40E+01 |
| Unknown aromatic HC | 50326 | 7/21/87 | ABN | 7.00E+00 |
| Alpha Activity (pCi/L) | 50016 | 9/12/85 | Alpha | 3.74E-01 |
| Alpha Activity (pCi/L) | 50030 | 4/15/86 | Alpha | 1.25E+01 |
| Alpha Activity (pCi/L) | 50103 | 8/01/86 | Alpha | 2.62E+01 |
| Alpha Activity (pCi/L) | 50218 | 1/09/87 | Alpha | 1.91E+01 |
| Alpha Activity (pCi/L) | 50279 | 4/10/87 | Alpha | 6.02E+01 |
| Alpha Activity (pCi/L) | 50326 | 7/21/87 | Alpha | 9.14E+00 |
| Alpha Activity (pCi/L) | 50350 | 10/02/87 | Alpha | 2.74E+00 |
| Beta Activity (pCi/L) | 50016 | 9/12/85 | Beta | 1.51E+01 |
| Beta Activity (pCi/L) | 50030 | 4/15/86 | Beta | 2.72E+01 |

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Table B-2. Total Data. (sheet 10 of 20)

| Constituent | Sample # | Date | Method | Result |
|---|----------|----------|----------|-----------|
| Beta Activity (pCi/L) | 50103 | 8/01/86 | Beta | 8.31E+01 |
| Beta Activity (pCi/L) | 50218 | 1/09/87 | Beta | 7.65E+01 |
| Beta Activity (pCi/L) | 50279 | 4/10/87 | Beta | 7.29E+01 |
| Beta Activity (pCi/L) | 50350 | 10/02/87 | Beta | 7.89E+00 |
| Conductivity (μS) | 50016 | 9/12/85 | COND-Fld | 1.21E+03 |
| Conductivity (μS) | 50103 | 8/01/86 | COND-Fld | 1.60E+04 |
| Conductivity (μS) | 50218 | 1/09/87 | COND-Fld | 1.14E+04 |
| Conductivity (μS) | 50279 | 4/10/87 | COND-Fld | 1.27E+04 |
| Conductivity (μS) | 50326 | 7/21/87 | COND-Fld | 1.53E+04 |
| Conductivity (μS) | 50350 | 10/02/87 | COND-Fld | 1.02E+04 |
| pH (dimensionless) | 50016 | 9/12/85 | PH-Fld | 1.16E+01 |
| pH (dimensionless) | 50030 | 4/15/86 | PH-Fld | 1.27E+01 |
| pH (dimensionless) | 50103 | 8/01/86 | PH-Fld | 8.70E+00 |
| pH (dimensionless) | 50218 | 1/09/87 | PH-Fld | 8.97E+00 |
| pH (dimensionless) | 50279 | 4/10/87 | PH-Fld | 9.78E+00 |
| pH (dimensionless) | 50326 | 7/21/87 | PH-Fld | 9.82E+00 |
| pH (dimensionless) | 50350 | 10/02/87 | PH-Fld | 1.03E+01 |
| Temperature (°C) | 50016 | 9/12/85 | TEMP-Fld | 2.37E+01 |
| Temperature (°C) | 50030 | 4/15/86 | TEMP-Fld | 1.50E+01 |
| Temperature (°C) | 50103 | 8/01/86 | TEMP-Fld | 3.03E+01 |
| Temperature (°C) | 50218 | 1/09/87 | TEMP-Fld | 1.64E+01 |
| Temperature (°C) | 50279 | 4/10/87 | TEMP-Fld | 1.63E+01 |
| Temperature (°C) | 50326 | 7/21/87 | TEMP-Fld | 2.71E+01 |
| Temperature (°C) | 50350 | 10/02/87 | TEMP-Fld | 2.75E+01 |
| TOC | 50016 | 9/12/85 | TOC | 1.82E+03 |
| TOC | 50030 | 4/15/86 | TOC | 5.23E+04 |
| TOC | 50103 | 8/01/86 | TOC | 2.69E+03 |
| TOC | 50218 | 1/09/87 | TOC | 1.84E+03 |
| TOC | 50279 | 4/10/87 | TOC | 2.48E+03 |
| TOC | 50326 | 7/21/87 | TOC | 4.00E+03 |
| TOC | 50350 | 10/02/87 | TOC | 4.36E+03 |
| TOX (as Cl) | 50016 | 9/12/85 | TOX | <7.60E+00 |
| TOX (as Cl) | 50030 | 4/15/86 | TOX | 1.33E+02 |
| TOX (as Cl) | 50103 | 8/01/86 | TOX | <5.64E+01 |
| TOX (as Cl) | 50218 | 1/09/87 | LTOX | 4.88E+01 |
| TOX (as Cl) | 50279 | 4/10/87 | LTOX | 3.76E+01 |
| TOX (as Cl) | 50326 | 7/21/87 | LTOX | 3.72E+01 |
| TOX (as Cl) | 50350 | 10/02/87 | LTOX | 7.67E+01 |
| Data for B Plant Chemical Sewage -- Routine | | | | |
| Arsenic (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Arsenic (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Arsenic (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Arsenic (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Barium | 50081 | 6/30/86 | ICP | 2.80E+01 |
| Barium | 50141 | 9/26/86 | ICP | 2.40E+01 |
| Barium | 50165 | 10/27/86 | ICP | 2.50E+01 |

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B-2. Total Data. (sheet 11 of 20)

| Constituent | Sample # | Date | Method | Result |
|--------------------|----------|----------|--------|-----------|
| Barium | 50256 | 3/16/87 | ICP | 2.40E+01 |
| Barium | 50285 | 4/16/87 | ICP | 2.40E+01 |
| Barium | 50705 | 10/19/89 | ICP | 2.90E+01 |
| Barium | 50752 | 11/02/89 | ICP | 3.00E+01 |
| Barium | 50756 | 11/03/89 | ICP | 3.10E+01 |
| Barium | 50984 | 2/27/90 | ICP | 2.70E+01 |
| Barium (EP Toxic) | 50705E | 10/19/89 | ICP | <1.00E+03 |
| Barium (EP Toxic) | 50752E | 11/02/89 | ICP | <1.00E+03 |
| Barium (EP Toxic) | 50756E | 11/03/89 | ICP | <1.00E+03 |
| Barium (EP Toxic) | 50984E | 2/27/90 | ICP | <1.00E+03 |
| Boron | 50705 | 10/19/89 | ICP | <1.00E+01 |
| Boron | 50752 | 11/02/89 | ICP | 1.00E+01 |
| Boron | 50756 | 11/03/89 | ICP | 1.20E+01 |
| Boron | 50984 | 2/27/90 | ICP | 4.20E+01 |
| Cadmium | 50081 | 6/30/86 | ICP | <2.00E+00 |
| Cadmium | 50141 | 9/26/86 | ICP | 3.00E+00 |
| Cadmium | 50165 | 10/27/86 | ICP | 3.00E+00 |
| Cadmium | 50256 | 3/16/87 | ICP | <2.00E+00 |
| Cadmium | 50285 | 4/16/87 | ICP | <2.00E+00 |
| Cadmium | 50705 | 10/19/89 | ICP | <2.00E+00 |
| Cadmium | 50752 | 11/02/89 | ICP | <2.00E+00 |
| Cadmium | 50756 | 11/03/89 | ICP | <2.00E+00 |
| Cadmium | 50984 | 2/27/90 | ICP | <2.00E+00 |
| Cadmium (EP Toxic) | 50705E | 10/19/89 | ICP | <1.00E+02 |
| Cadmium (EP Toxic) | 50752E | 11/02/89 | ICP | <1.00E+02 |
| Cadmium (EP Toxic) | 50756E | 11/03/89 | ICP | <1.00E+02 |
| Cadmium (EP Toxic) | 50984E | 2/27/90 | ICP | <1.00E+02 |
| Calcium | 50081 | 6/30/86 | ICP | 1.72E+04 |
| Calcium | 50141 | 9/26/86 | ICP | 1.80E+04 |
| Calcium | 50165 | 10/27/86 | ICP | 1.86E+04 |
| Calcium | 50256 | 3/16/87 | ICP | 1.93E+04 |
| Calcium | 50285 | 4/16/87 | ICP | 1.95E+04 |
| Calcium | 50705 | 10/19/89 | ICP | 1.86E+04 |
| Calcium | 50752 | 11/02/89 | ICP | 1.89E+04 |
| Calcium | 50756 | 11/03/89 | ICP | 1.84E+04 |
| Calcium | 50984 | 2/27/90 | ICP | 1.79E+04 |
| Chloride | 50081 | 6/30/86 | IC | 9.60E+02 |
| Chloride | 50141 | 9/26/86 | IC | 1.93E+03 |
| Chloride | 50165 | 10/27/86 | IC | 9.13E+02 |
| Chloride | 50256 | 3/16/87 | IC | 1.49E+03 |
| Chloride | 50285 | 4/16/87 | IC | 1.11E+03 |
| Chloride | 50705 | 10/19/89 | IC | 1.90E+03 |
| Chloride | 50752 | 11/02/89 | IC | 1.50E+03 |
| Chloride | 50756 | 11/03/89 | IC | 1.50E+03 |
| Chloride | 50984 | 2/27/90 | IC | 1.10E+03 |

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Table B-2. Total Data. (sheet 12 of 20)

| Constituent | Sample # | Date | Method | Result |
|---------------------|----------|----------|--------|-----------|
| Chromium (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Chromium (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Chromium (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Chromium (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Copper | 50081 | 6/30/86 | ICP | <1.00E+01 |
| Copper | 50141 | 9/26/86 | ICP | <1.00E+01 |
| Copper | 50165 | 10/27/86 | ICP | 1.20E+01 |
| Copper | 50256 | 3/16/87 | ICP | <1.00E+01 |
| Copper | 50285 | 4/16/87 | ICP | <1.00E+01 |
| Copper | 50705 | 10/19/89 | ICP | 1.30E+01 |
| Copper | 50752 | 11/02/89 | ICP | 2.10E+01 |
| Copper | 50756 | 11/03/89 | ICP | 3.60E+01 |
| Copper | 50984 | 2/27/90 | ICP | 1.50E+01 |
| Fluoride | 50081 | 6/30/86 | IC | <5.00E+02 |
| Fluoride | 50141 | 9/26/86 | IC | <5.00E+02 |
| Fluoride | 50165 | 10/27/86 | IC | <5.00E+02 |
| Fluoride | 50256 | 3/16/87 | IC | <5.00E+02 |
| Fluoride | 50285 | 4/16/87 | IC | <5.00E+02 |
| Fluoride | 50705 | 10/19/89 | IC | <5.00E+02 |
| Fluoride | 50705 | 10/19/89 | ISE | 1.40E+02 |
| Fluoride | 50752 | 11/02/89 | IC | <5.00E+02 |
| Fluoride | 50752 | 11/02/89 | ISE | 1.43E+02 |
| Fluoride | 50756 | 11/03/89 | IC | <5.00E+02 |
| Fluoride | 50756 | 11/03/89 | ISE | 1.36E+02 |
| Fluoride | 50984 | 2/27/90 | IC | <5.00E+02 |
| Fluoride | 50984 | 2/27/90 | ISE | 1.37E+02 |
| Iron | 50081 | 6/30/86 | ICP | 7.70E+01 |
| Iron | 50141 | 9/26/86 | ICP | 6.90E+01 |
| Iron | 50165 | 10/27/86 | ICP | 7.40E+01 |
| Iron | 50256 | 3/16/87 | ICP | <5.00E+01 |
| Iron | 50285 | 4/16/87 | ICP | 5.90E+01 |
| Iron | 50705 | 10/19/89 | ICP | 4.60E+01 |
| Iron | 50752 | 11/02/89 | ICP | <3.00E+01 |
| Iron | 50756 | 11/03/89 | ICP | 6.70E+01 |
| Iron | 50984 | 2/27/90 | ICP | 7.00E+01 |
| Lead | 50141 | 9/26/86 | GFAA | 5.10E+00 |
| Lead | 50165 | 10/27/86 | GFAA | 1.16E+01 |
| Lead | 50256 | 3/16/87 | GFAA | <5.00E+00 |
| Lead | 50285 | 4/16/87 | GFAA | <5.00E+00 |
| Lead | 50705 | 10/19/89 | GFAA | <5.00E+00 |
| Lead | 50752 | 11/02/89 | GFAA | <5.00E+00 |
| Lead | 50756 | 11/03/89 | GFAA | <5.00E+00 |
| Lead | 50984 | 2/27/90 | GFAA | <5.00E+00 |
| Lead (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Lead (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |

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Table B-2. Total Data. (sheet 13 of 20)

| Constituent | Sample # | Date | Method | Result |
|--------------------|----------|----------|--------|-----------|
| Lead (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Lead (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Magnesium | 50081 | 6/30/86 | ICP | 4.01E+03 |
| Magnesium | 50141 | 9/26/86 | ICP | 3.94E+03 |
| Magnesium | 50165 | 10/27/86 | ICP | 3.94E+03 |
| Magnesium | 50256 | 3/16/87 | ICP | 4.39E+03 |
| Magnesium | 50285 | 4/16/87 | ICP | 4.57E+03 |
| Magnesium | 50705 | 10/19/89 | ICP | 4.09E+03 |
| Magnesium | 50752 | 11/02/89 | ICP | 4.32E+03 |
| Magnesium | 50756 | 11/03/89 | ICP | 4.23E+03 |
| Magnesium | 50984 | 2/27/90 | ICP | 3.95E+03 |
| Manganese | 50081 | 6/30/86 | ICP | 1.00E+01 |
| Manganese | 50141 | 9/26/86 | ICP | 7.00E+00 |
| Manganese | 50165 | 10/27/86 | ICP | 7.00E+00 |
| Manganese | 50256 | 3/16/87 | ICP | <5.00E+00 |
| Manganese | 50285 | 4/16/87 | ICP | <5.00E+00 |
| Manganese | 50705 | 10/19/89 | ICP | 7.00E+00 |
| Manganese | 50752 | 11/02/89 | ICP | <5.00E+00 |
| Manganese | 50756 | 11/03/89 | ICP | 6.00E+00 |
| Manganese | 50984 | 2/27/90 | ICP | <5.00E+00 |
| Mercury (EP Toxic) | 50705E | 10/19/89 | CVAA/M | <2.00E+01 |
| Mercury (EP Toxic) | 50752E | 11/02/89 | CVAA/M | <2.00E+01 |
| Mercury (EP Toxic) | 50756E | 11/03/89 | CVAA/M | <2.00E+01 |
| Mercury (EP Toxic) | 50984E | 2/27/90 | CVAA/M | <2.00E+01 |
| Nitrate | 50081 | 6/30/86 | IC | 2.64E+03 |
| Nitrate | 50141 | 9/26/86 | IC | <5.00E+02 |
| Nitrate | 50165 | 10/27/86 | IC | 1.21E+03 |
| Nitrate | 50256 | 3/16/87 | IC | <5.00E+02 |
| Nitrate | 50285 | 4/16/87 | IC | <5.00E+02 |
| Nitrate | 50705 | 10/19/89 | IC | <5.00E+02 |
| Nitrate | 50752 | 11/02/89 | IC | <5.00E+02 |
| Nitrate | 50756 | 11/03/89 | IC | <5.00E+02 |
| Nitrate | 50984 | 2/27/90 | IC | <5.00E+02 |
| Phosphate | 50081 | 6/30/86 | IC | <1.00E+03 |
| Phosphate | 50141 | 9/26/86 | IC | 3.19E+03 |
| Phosphate | 50165 | 10/27/86 | IC | <1.00E+03 |
| Phosphate | 50256 | 3/16/87 | IC | <1.00E+03 |
| Phosphate | 50285 | 4/16/87 | IC | <1.00E+03 |
| Phosphate | 50705 | 10/19/89 | IC | <1.00E+03 |
| Phosphate | 50752 | 11/02/89 | IC | <1.00E+03 |
| Phosphate | 50756 | 11/03/89 | IC | <1.00E+03 |
| Phosphate | 50984 | 2/27/90 | IC | <1.00E+03 |
| Potassium | 50081 | 6/30/86 | ICP | 8.19E+02 |
| Potassium | 50141 | 9/26/86 | ICP | 1.02E+03 |
| Potassium | 50165 | 10/27/86 | ICP | 8.86E+02 |

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Table B-2. Total Data. (sheet 14 of 20)

| Constituent | Sample # | Date | Method | Result |
|---------------------|----------|----------|--------|-----------|
| Potassium | 50256 | 3/16/87 | ICP | 7.46E+02 |
| Potassium | 50285 | 4/16/87 | ICP | 9.58E+02 |
| Potassium | 50705 | 10/19/89 | ICP | 6.88E+02 |
| Potassium | 50752 | 11/02/89 | ICP | 7.42E+02 |
| Potassium | 50756 | 11/03/89 | ICP | 8.49E+02 |
| Potassium | 50984 | 2/27/90 | ICP | 9.23E+02 |
| Selenium (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Selenium (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Selenium (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Selenium (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Silicon | 50705 | 10/19/89 | ICP | 2.20E+03 |
| Silicon | 50752 | 11/02/89 | ICP | 2.44E+03 |
| Silicon | 50756 | 11/03/89 | ICP | 2.41E+03 |
| Silicon | 50984 | 2/27/90 | ICP | 2.23E+03 |
| Silver (EP Toxic) | 50705E | 10/19/89 | ICP | <5.00E+02 |
| Silver (EP Toxic) | 50752E | 11/02/89 | ICP | <5.00E+02 |
| Silver (EP Toxic) | 50756E | 11/03/89 | ICP | <5.00E+02 |
| Silver (EP Toxic) | 50984E | 2/27/90 | ICP | <5.00E+02 |
| Sodium | 50081 | 6/30/86 | ICP | 2.89E+03 |
| Sodium | 50141 | 9/26/86 | ICP | 5.44E+03 |
| Sodium | 50165 | 10/27/86 | ICP | 2.00E+03 |
| Sodium | 50256 | 3/16/87 | ICP | 2.00E+03 |
| Sodium | 50285 | 4/16/87 | ICP | 4.68E+03 |
| Sodium | 50705 | 10/19/89 | ICP | 2.19E+03 |
| Sodium | 50752 | 11/02/89 | ICP | 2.15E+03 |
| Sodium | 50756 | 11/03/89 | ICP | 2.27E+03 |
| Sodium | 50984 | 2/27/90 | ICP | 1.88E+03 |
| Strontium | 50081 | 6/30/86 | ICP | <3.00E+02 |
| Strontium | 50141 | 9/26/86 | ICP | <3.00E+02 |
| Strontium | 50165 | 10/27/86 | ICP | <3.00E+02 |
| Strontium | 50256 | 3/16/87 | ICP | <3.00E+02 |
| Strontium | 50285 | 4/16/87 | ICP | <3.00E+02 |
| Strontium | 50705 | 10/19/89 | ICP | 9.70E+01 |
| Strontium | 50752 | 11/02/89 | ICP | 9.90E+01 |
| Strontium | 50756 | 11/03/89 | ICP | 1.02E+02 |
| Strontium | 50984 | 2/27/90 | ICP | 8.70E+01 |
| Sulfate | 50081 | 6/30/86 | IC | 1.08E+04 |
| Sulfate | 50141 | 9/26/86 | IC | 1.07E+04 |
| Sulfate | 50165 | 10/27/86 | IC | 9.52E+03 |
| Sulfate | 50256 | 3/16/87 | IC | 1.39E+04 |
| Sulfate | 50285 | 4/16/87 | IC | 1.35E+04 |
| Sulfate | 50705 | 10/19/89 | IC | 1.22E+04 |
| Sulfate | 50752 | 11/02/89 | IC | 1.11E+04 |
| Sulfate | 50756 | 11/03/89 | IC | 1.08E+04 |
| Sulfate | 50984 | 2/27/90 | IC | 1.03E+04 |

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Table B-2. Total Data. (sheet 15 of 20)

| Constituent | Sample # | Date | Method | Result |
|-----------------|----------|----------|--------|-----------|
| Uranium | 50081 | 6/30/86 | FLUOR | 4.73E-01 |
| Uranium | 50141 | 9/26/86 | FLUOR | 5.83E-01 |
| Uranium | 50165 | 10/27/86 | FLUOR | 7.51E-01 |
| Uranium | 50256 | 3/16/87 | FLUOR | 3.31E-01 |
| Uranium | 50285 | 4/16/87 | FLUOR | 6.39E-01 |
| Uranium | 50705 | 10/19/89 | FLUOR | 5.36E-01 |
| Uranium | 50752 | 11/02/89 | FLUOR | 4.54E-01 |
| Uranium | 50756 | 11/03/89 | FLUOR | 4.23E-01 |
| Zinc | 50081 | 6/30/86 | ICP | 9.00E+00 |
| Zinc | 50141 | 9/26/86 | ICP | 9.00E+00 |
| Zinc | 50165 | 10/27/86 | ICP | 6.30E+01 |
| Zinc | 50256 | 3/16/87 | ICP | 1.10E+01 |
| Zinc | 50285 | 4/16/87 | ICP | 8.00E+00 |
| Zinc | 50705 | 10/19/89 | ICP | 1.30E+01 |
| Zinc | 50752 | 11/02/89 | ICP | 1.00E+01 |
| Zinc | 50756 | 11/03/89 | ICP | 1.60E+01 |
| Zinc | 50984 | 2/27/90 | ICP | 1.20E+01 |
| Acetone | 50705 | 10/19/89 | VOA | 1.50E+01 |
| Acetone | 50705 | 10/19/89 | ABN | <1.00E+01 |
| Acetone | 50705B | 10/19/89 | VOA | 2.10E+01 |
| Acetone | 50705T | 10/19/89 | VOA | 1.40E+01 |
| Acetone | 50752 | 11/02/89 | VOA | <1.00E+01 |
| Acetone | 50752 | 11/02/89 | ABN | <1.00E+01 |
| Acetone | 50752B | 11/02/89 | VOA | <1.00E+01 |
| Acetone | 50752T | 11/02/89 | VOA | <1.00E+01 |
| Acetone | 50756 | 11/03/89 | VOA | <1.00E+01 |
| Acetone | 50756 | 11/03/89 | ABN | <1.00E+01 |
| Acetone | 50756B | 11/03/89 | VOA | <1.00E+01 |
| Acetone | 50756T | 11/03/89 | VOA | <1.00E+01 |
| Acetone | 50984 | 2/27/90 | VOA | <1.00E+01 |
| Acetone | 50984 | 2/27/90 | ABN | <1.00E+01 |
| Acetone | 50984B | 2/27/90 | VOA | <1.00E+01 |
| Acetone | 50984T | 2/27/90 | VOA | <1.00E+01 |
| Ammonia | 50081 | 6/30/86 | ISE | <5.00E+01 |
| Ammonia | 50141 | 9/26/86 | ISE | <5.00E+01 |
| Ammonia | 50165 | 10/27/86 | ISE | 2.40E+02 |
| Ammonia | 50256 | 3/16/87 | ISE | <5.00E+01 |
| Ammonia | 50285 | 4/16/87 | ISE | <5.00E+01 |
| Ammonia | 50705 | 10/19/89 | ISE | 7.10E+01 |
| Ammonia | 50752 | 11/02/89 | ISE | <5.00E+01 |
| Ammonia | 50756 | 11/03/89 | ISE | <5.00E+01 |
| Ammonia | 50984 | 2/27/90 | ISE | <5.00E+01 |
| Dichloromethane | 50081 | 6/30/86 | VOA | <1.00E+01 |
| Dichloromethane | 50081B | 6/30/86 | VOA | 1.70E+02 |
| Dichloromethane | 50141 | 9/26/86 | VOA | <1.00E+01 |

Table B-2. Total Data. (sheet 16 of 20)

| Constituent | Sample # | Date | Method | Result |
|------------------|----------|----------|--------|-----------|
| Dichloromethane | 50141B | 9/26/86 | VOA | 1.30E+02 |
| Dichloromethane | 50165 | 10/27/86 | VOA | <1.00E+01 |
| Dichloromethane | 50256 | 3/16/87 | VOA | <1.00E+01 |
| Dichloromethane | 50256B | 3/16/87 | VOA | 4.60E+01 |
| Dichloromethane | 50285 | 4/16/87 | VOA | <1.00E+01 |
| Dichloromethane | 50285B | 4/16/87 | VOA | 3.80E+01 |
| Dichloromethane | 50705 | 10/19/89 | VOA | <5.00E+00 |
| Dichloromethane | 50705B | 10/19/89 | VOA | <3.00E+00 |
| Dichloromethane | 50705T | 10/19/89 | VOA | 1.20E+01 |
| Dichloromethane | 50752 | 11/02/89 | VOA | <5.00E+00 |
| Dichloromethane | 50752B | 11/02/89 | VOA | <5.00E+00 |
| Dichloromethane | 50752T | 11/02/89 | VOA | 7.00E+00 |
| Dichloromethane | 50756 | 11/03/89 | VOA | <5.00E+00 |
| Dichloromethane | 50756B | 11/03/89 | VOA | 8.00E+00 |
| Dichloromethane | 50756T | 11/03/89 | VOA | 8.00E+00 |
| Dichloromethane | 50984 | 2/27/90 | VOA | <5.00E+00 |
| Dichloromethane | 50984B | 2/27/90 | VOA | <5.00E+00 |
| Dichloromethane | 50984T | 2/27/90 | VOA | <5.00E+00 |
| Tetrahydrofuran | 50705 | 10/19/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50705B | 10/19/89 | VOA | 1.70E+01 |
| Tetrahydrofuran | 50705T | 10/19/89 | VOA | <6.00E+00 |
| Tetrahydrofuran | 50752 | 11/02/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50752B | 11/02/89 | VOA | 1.40E+01 |
| Tetrahydrofuran | 50752T | 11/02/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50756 | 11/03/89 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50756B | 11/03/89 | VOA | 1.20E+01 |
| Tetrahydrofuran | 50756T | 11/03/89 | VOA | 1.20E+01 |
| Tetrahydrofuran | 50984 | 2/27/90 | VOA | <1.00E+01 |
| Tetrahydrofuran | 50984B | 2/27/90 | VOA | <6.00E+00 |
| Tetrahydrofuran | 50984T | 2/27/90 | VOA | <6.00E+00 |
| Trichloromethane | 50081 | 6/30/86 | VOA | <1.00E+01 |
| Trichloromethane | 50081B | 6/30/86 | VOA | <1.00E+01 |
| Trichloromethane | 50141 | 9/26/86 | VOA | <1.00E+01 |
| Trichloromethane | 50141B | 9/26/86 | VOA | <1.00E+01 |
| Trichloromethane | 50165 | 10/27/86 | VOA | <1.00E+01 |
| Trichloromethane | 50256 | 3/16/87 | VOA | <1.00E+01 |
| Trichloromethane | 50256B | 3/16/87 | VOA | <1.00E+01 |
| Trichloromethane | 50285 | 4/16/87 | VOA | <1.00E+01 |
| Trichloromethane | 50285B | 4/16/87 | VOA | <1.00E+01 |
| Trichloromethane | 50705 | 10/19/89 | VOA | <3.00E+00 |
| Trichloromethane | 50705B | 10/19/89 | VOA | <5.00E+00 |
| Trichloromethane | 50705T | 10/19/89 | VOA | <5.00E+00 |
| Trichloromethane | 50752 | 11/02/89 | VOA | <5.00E+00 |
| Trichloromethane | 50752B | 11/02/89 | VOA | <5.00E+00 |
| Trichloromethane | 50752T | 11/02/89 | VOA | <3.00E+00 |

Table B-2. Total Data. (sheet 17 of 20)

| Constituent | Sample # | Date | Method | Result |
|------------------------|----------|----------|----------|-----------|
| Trichloromethane | 50756 | 11/03/89 | VOA | <3.00E+00 |
| Trichloromethane | 50756B | 11/03/89 | VOA | <3.00E+00 |
| Trichloromethane | 50756T | 11/03/89 | VOA | <3.00E+00 |
| Trichloromethane | 50984 | 2/27/90 | VOA | <5.00E+00 |
| Trichloromethane | 50984B | 2/27/90 | VOA | 1.20E+01 |
| Trichloromethane | 50984T | 2/27/90 | VOA | 8.00E+00 |
| Unknown amide | 50756 | 11/03/89 | ABN | 2.30E+01 |
| Alkalinity (Method B) | 50705 | 10/19/89 | TITRA | 5.40E+04 |
| Alkalinity (Method B) | 50752 | 11/02/89 | TITRA | 5.70E+04 |
| Alkalinity (Method B) | 50756 | 11/03/89 | TITRA | 5.60E+04 |
| Alkalinity (Method B) | 50984 | 2/27/90 | TITRA | 5.70E+04 |
| Alpha Activity (pCi/L) | 50081 | 6/30/86 | Alpha | 8.27E-02 |
| Alpha Activity (pCi/L) | 50141 | 9/26/86 | Alpha | 8.39E-01 |
| Alpha Activity (pCi/L) | 50165 | 10/27/86 | Alpha | 3.53E-01 |
| Alpha Activity (pCi/L) | 50256 | 3/16/87 | Alpha | 3.56E-01 |
| Alpha Activity (pCi/L) | 50285 | 4/16/87 | Alpha | 3.29E-01 |
| Alpha Activity (pCi/L) | 50705 | 10/19/89 | Alpha | <2.68E-01 |
| Alpha Activity (pCi/L) | 50752 | 11/02/89 | Alpha | <5.75E-01 |
| Alpha Activity (pCi/L) | 50756 | 11/03/89 | Alpha | 8.22E-01 |
| Beta Activity (pCi/L) | 50081 | 6/30/86 | Beta | 3.06E+02 |
| Beta Activity (pCi/L) | 50141 | 9/26/86 | Beta | 7.90E+00 |
| Beta Activity (pCi/L) | 50165 | 10/27/86 | Beta | 1.78E+02 |
| Beta Activity (pCi/L) | 50256 | 3/16/87 | Beta | 8.35E+00 |
| Beta Activity (pCi/L) | 50285 | 4/16/87 | Beta | 1.17E+00 |
| Beta Activity (pCi/L) | 50705 | 10/19/89 | Beta | 2.97E+00 |
| Beta Activity (pCi/L) | 50752 | 11/02/89 | Beta | <1.48E+00 |
| Beta Activity (pCi/L) | 50756 | 11/03/89 | Beta | <2.09E+00 |
| Conductivity (μS) | 50081 | 6/30/86 | COND-Fld | 1.34E+02 |
| Conductivity (μS) | 50141 | 9/26/86 | COND-Fld | 1.50E+02 |
| Conductivity (μS) | 50165 | 10/27/86 | COND-Fld | 1.45E+02 |
| Conductivity (μS) | 50256 | 3/16/87 | COND-Fld | 1.19E+02 |
| Conductivity (μS) | 50285 | 4/16/87 | COND-Fld | 1.36E+02 |
| Conductivity (μS) | 50705 | 10/19/89 | COND-Fld | 1.75E+02 |
| Conductivity (μS) | 50752 | 11/02/89 | COND-Fld | 1.33E+02 |
| Conductivity (μS) | 50756 | 11/03/89 | COND-Fld | 1.53E+02 |
| Conductivity (μS) | 50984 | 2/27/90 | COND-Fld | 1.22E+02 |
| Ignitability (°F) | 50705E | 10/19/89 | IGNIT | 2.08E+02 |
| Ignitability (°F) | 50752E | 11/02/89 | IGNIT | 2.12E+02 |
| Ignitability (°F) | 50756E | 11/03/89 | IGNIT | 2.10E+02 |
| Ignitability (°F) | 50984E | 2/27/90 | IGNIT | 2.06E+02 |
| pH (dimensionless) | 50081 | 6/30/86 | PH-Fld | 6.40E+00 |
| pH (dimensionless) | 50141 | 9/26/86 | PH-Fld | 6.32E+00 |
| pH (dimensionless) | 50165 | 10/27/86 | PH-Fld | 5.40E+00 |
| pH (dimensionless) | 50256 | 3/16/87 | PH-Fld | 5.22E+00 |
| pH (dimensionless) | 50285 | 4/16/87 | PH-Fld | 5.70E+00 |
| pH (dimensionless) | 50705 | 10/19/89 | PH-Fld | 7.60E+00 |
| pH (dimensionless) | 50752 | 11/02/89 | PH-Fld | 7.41E+00 |

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Table B-2. Total Data. (sheet 18 of 20)

| Constituent | Sample # | Date | Method | Result |
|----------------------------|----------|----------|----------|-----------|
| pH (dimensionless) | 50756 | 11/03/89 | PH-Fld | 7.70E+00 |
| pH (dimensionless) | 50984 | 2/27/90 | PH-Fld | 7.10E+00 |
| Reactivity Cyanide (mg/kg) | 50705E | 10/19/89 | DSPEC | <1.00E+02 |
| Reactivity Cyanide (mg/kg) | 50752E | 11/02/89 | DSPEC | <1.00E+02 |
| Reactivity Cyanide (mg/kg) | 50756E | 11/03/89 | DSPEC | <1.00E+02 |
| Reactivity Cyanide (mg/kg) | 50984E | 2/27/90 | DSPEC | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50705E | 10/19/89 | DTITRA | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50752E | 11/02/89 | DTITRA | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50756E | 11/03/89 | DTITRA | <1.00E+02 |
| Reactivity Sulfide (mg/kg) | 50984E | 2/27/90 | DTITRA | <1.00E+02 |
| TDS | 50705 | 10/19/89 | TDS | 5.00E+04 |
| TDS | 50752 | 11/02/89 | TDS | 4.70E+04 |
| TDS | 50756 | 11/03/89 | TDS | 5.20E+04 |
| TDS | 50984 | 2/27/90 | TDS | 5.40E+04 |
| Temperature (°C) | 50081 | 6/30/86 | TEMP-Fld | 2.55E+01 |
| Temperature (°C) | 50141 | 9/26/86 | TEMP-Fld | 2.89E+01 |
| Temperature (°C) | 50256 | 3/16/87 | TEMP-Fld | 1.70E+01 |
| Temperature (°C) | 50285 | 4/16/87 | TEMP-Fld | 1.79E+01 |
| Temperature (°C) | 50705 | 10/19/89 | TEMP-Fld | 2.74E+01 |
| Temperature (°C) | 50752 | 11/02/89 | TEMP-Fld | 1.86E+01 |
| Temperature (°C) | 50756 | 11/03/89 | TEMP-Fld | 2.03E+01 |
| Temperature (°C) | 50984 | 2/27/90 | TEMP-Fld | 1.71E+01 |
| TOC | 50081 | 6/30/86 | TOC | 2.51E+03 |
| TOC | 50141 | 9/26/86 | TOC | 1.70E+03 |
| TOC | 50165 | 10/27/86 | TOC | 1.24E+03 |
| TOC | 50256 | 3/16/87 | TOC | 1.07E+03 |
| TOC | 50285 | 4/16/87 | TOC | 1.33E+03 |
| TOC | 50705 | 10/19/89 | TOC | <1.60E+03 |
| TOC | 50752 | 11/02/89 | TOC | <1.20E+03 |
| TOC | 50756 | 11/03/89 | TOC | <1.20E+03 |
| TOC | 50984 | 2/27/90 | TOC | 1.10E+03 |
| Total Carbon | 50705 | 10/19/89 | TC | 1.60E+04 |
| Total Carbon | 50752 | 11/02/89 | TC | 1.42E+04 |
| Total Carbon | 50756 | 11/03/89 | TC | 1.32E+04 |
| Total Carbon | 50984 | 2/27/90 | TC | 1.39E+04 |
| TOX (as Cl) | 50081 | 6/30/86 | TOX | <2.78E+01 |
| TOX (as Cl) | 50141 | 9/26/86 | TOX | <4.59E+01 |
| TOX (as Cl) | 50165 | 10/27/86 | TOX | <1.00E+02 |
| TOX (as Cl) | 50256 | 3/16/87 | LTOX | 6.12E+01 |
| TOX (as Cl) | 50285 | 4/16/87 | LTOX | 2.82E+01 |
| TOX (as Cl) | 50705 | 10/19/89 | LTOX | 4.30E+01 |
| TOX (as Cl) | 50752 | 11/02/89 | LTOX | 4.50E+01 |
| TOX (as Cl) | 50756 | 11/03/89 | LTOX | 5.90E+01 |
| TOX (as Cl) | 50984 | 2/27/90 | LTOX | 2.60E+01 |
| ²⁴² Cm (pCi/L) | 50705 | 10/19/89 | AEA | <3.81E-03 |
| ²⁴² Cm (pCi/L) | 50756 | 11/03/89 | AEA | 5.31E-03 |

Table B-2. Total Data. (sheet 19 of 20)

| Constituent | Sample # | Date | Method | Result |
|---------------------------|----------|----------|--------|-----------|
| ¹³⁷ Cs (pCi/L) | 50705 | 10/19/89 | GEA | 1.73E+00 |
| ¹³⁷ Cs (pCi/L) | 50752 | 11/02/89 | GEA | 4.95E-01 |
| ¹⁴ C (pCi/L) | 50752 | 11/02/89 | LSC | 4.98E+00 |
| ¹⁴ C (pCi/L) | 50756 | 11/03/89 | LSC | <3.51E+00 |
| ³ H (pCi/L) | 50705 | 10/19/89 | LSC | <1.99E+02 |
| ³ H (pCi/L) | 50752 | 11/02/89 | LSC | <2.90E+01 |
| ³ H (pCi/L) | 50756 | 11/03/89 | LSC | 2.50E+02 |
| ⁹⁰ Sr (pCi/L) | 50705 | 10/19/89 | Beta | 1.24E-01 |
| ⁹⁰ Sr (pCi/L) | 50752 | 11/02/89 | Beta | <9.89E-02 |
| ⁹⁰ Sr (pCi/L) | 50756 | 11/03/89 | Beta | 2.09E-01 |
| ²³⁴ U (pCi/L) | 50705 | 10/19/89 | AEA | 1.89E-01 |
| ²³⁴ U (pCi/L) | 50752 | 11/02/89 | AEA | 1.78E-01 |
| ²³⁴ U (pCi/L) | 50756 | 11/03/89 | AEA | 1.14E-01 |
| ²³⁸ U (pCi/L) | 50705 | 10/19/89 | AEA | 1.43E-01 |
| ²³⁸ U (pCi/L) | 50752 | 11/02/89 | AEA | 1.36E-01 |
| ²³⁸ U (pCi/L) | 50756 | 11/03/89 | AEA | 1.33E-01 |

Sample# is the number of the sample. See chapter three for corresponding chain-of-custody number. Date is the sampling date. Results are in ppb (parts per billion) unless otherwise indicated. The following table lists the methods that are coded in the method column.

| Code | Analytical Method | Reference |
|----------|---|-----------------|
| ABN | Semivolatile Organics (GC/MS) | USEPA-8270 |
| AEA | ²⁴¹ Am | UST-20Am01 |
| AEA | Curium Isotopes | UST-20Am/Cm01 |
| AEA | Plutonium Isotopes | UST-20Pu01 |
| AEA | Uranium Isotopes | UST-20U01 |
| ALPHA | Alpha Counting | EPA-680/4-75/1 |
| ALPHA-Ra | Total Radium Alpha Counting | ASTM-D2460 |
| BETA | Beta Counting | EPA-680/4-75/1 |
| BETA | ⁹⁰ Sr | UST-20Sr02 |
| COLIF | Coliform Bacteria | USEPA-9131 |
| COLIFMF | Coliform Bacteria (Membrane Filter) | USEPA-9132 |
| COND-Fld | Conductivity-Field | ASTM-D1125A |
| COND-Lab | Conductivity-Laboratory | ASTM-D1125A |
| CVAA | Mercury | USEPA-7470 |
| CVAA/M | Mercury-Mixed Matrix | USEPA-7470 |
| DIGC | Direct Aqueous Injection (GC) | UST-70DIGC |
| DIMS | Direct Aqueous Injection (GC/MS) | "USEPA-8240" |
| DSPEC | Reactive Cyanide (Distillation, Spectroscopy) | USEPA-CHAPTER 7 |
| DTITRA | Reactive Sulfide (Distillation, Titration) | USEPA-CHAPTER 7 |
| FLUOR | Uranium (Fluorometry) | ASTM-D2907-83 |
| GEA | Gamma Energy Analysis Spectroscopy | ASTM-D3649-85 |
| GFAA | Arsenic (AA, Furnace Technique) | USEPA-7060 |
| GFAA | Lead (AA, Furnace Technique) | USEPA-7421 |

Table B-2. Total Data. (sheet 20 of 20)

| Code | Analytical Method | Reference |
|----------|---|-----------------|
| GFAA | Selenium (AA, Furnace Technique) | USEPA-7740 |
| GFAA | Thallium (AA, Furnace Technique) | USEPA-7841 |
| IC | Ion Chromatography | EPA-600/4-84-01 |
| ICP | Atomic Emission Spectroscopy (ICP) | USEPA-6010 |
| ICP/M | Atomic Emission Spectroscopy (ICP)-Mixed Matrix | USEPA-6010 |
| IGNIT | Pensky-Martens Closed-Cup Ignitability | USEPA-1010 |
| ISE | Fluoride-Low Detection Limit | ASTM-D1179-80-B |
| ISE | Ammonium Ion | ASTM-D1426-D |
| LALPHA | Alpha Activity-Low Detection Limit | EPA-680/4-75/1 |
| LEPD | ¹²⁹ I | UST-20I02 |
| LSC | ¹⁴ C | UST-20C01 |
| LSC | Tritium | UST-20H03 |
| LTOX | Total Organic Halides-Low Detection Limit | USEPA-9020 |
| PH-Fld | pH-Field | USEPA-9040 |
| PH-Lab | pH-Laboratory | USEPA-9040 |
| SPEC | Total and Amenable Cyanide (Spectroscopy) | USEPA-9010 |
| SPEC | Hydrazine-Low Detection Limit (Spectroscopy) | ASTM-D1385 |
| SSOLID | Suspended Solids | SM-208D |
| TC | Total Carbon | USEPA-9060 |
| TDS | Total Dissolved Solids | SM-208B |
| TEMP-Fld | Temperature-Field | Local |
| TITRA | Alkalinity-Method B (Titration) | ASTM-D1067B |
| TITRA | Sulfides (Titration) | USEPA-9030 |
| TOC | Total Organic Carbon | USEPA-9060 |
| TOX | Total Organic Halides | USEPA-9020 |
| VOA | Volatile Organics (GC/MS) | USEPA-8240 |

Analytical Method Acronyms:

atomic absorption spectroscopy (AA)
gas chromatography (GC)
mass spectrometry (MS)
inductively-coupled plasma spectroscopy (ICP).

References:

ASTM - "1986 Annual Book of ASTM Standards," American Society for Testing and Materials, Philadelphia, Pennsylvania.
EPA - Various methods of the U.S. Environmental Protection Agency, Washington, D.C.
UST - Methods of the United States Testing Company, Incorporated, Richland, Washington.
SM - "Standard Methods for the Examination of Water and Wastewater," 16th ed., American Public Health Association, American Water Works Association and Water Pollution Control Federation, Washington, D.C.
USEPA - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd ed., SW-846, U.S. Environmental Protection Agency, Washington, D.C.

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